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REVIEW OF LITERATURE

NEED/IMPORTANCE OF THE STUDY

STATEMENT OF THE PROBLEM

OBJECTIVES

HYPOTHESES

RESEARCH METHODOLOGY

RESULTS & DISCUSSION

FINDINGS

RECOMMENDATIONS/SUGGESTIONS

CONCLUSIONS

SCOPE FOR FURTHER RESEARCH

ACKNOWLEDGMENTS

REFERENCES

APPENDIX/ANNEXURE

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**BOOKS**

•   Bowersox, Donald J., Closs, David J., (1996), "Logistical Management." Tata McGraw, Hill, New Delhi.

•   Hunker, H.L. and A.J. Wright (1963), "Factors of Industrial Location in Ohio" Ohio State University, Nigeria.

**CONTRIBUTIONS TO BOOKS**

•   Sharma T., Kwatra, G. (2008) Effectiveness of Social Advertising: A Study of Selected Campaigns, Corporate Social Responsibility, Edited by David Crowther & Nicholas Capaldi, Ashgate Research Companion to Corporate Social Responsibility, Chapter 15, pp 287-303.

**JOURNAL AND OTHER ARTICLES**

•   Schemenner, R.W., Huber, J.C. and Cook, R.L. (1987), "Geographic Differences and the Location of New Manufacturing Facilities," Journal of Urban Economics, Vol. 21, No. 1, pp. 83-104.

**CONFERENCE PAPERS**

•   Garg, Sambhav (2011): "Business Ethics" Paper presented at the Annual International Conference for the All India Management Association, New Delhi, India, 19–22 June.

**UNPUBLISHED DISSERTATIONS AND THESES**

•   Kumar S. (2011): "Customer Value: A Comparative Study of Rural and Urban Customers," Thesis, Kurukshetra University, Kurukshetra.

**ONLINE RESOURCES**

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**WEBSITES**

•   Garg, Bhavet (2011): Towards a New Natural Gas Policy, Political Weekly, Viewed on January 01, 2012 http://epw.in/user/viewabstract.jsp

# DETERMINING EFFECTIVE FACTORS ON ADJUSTMENT SPEED OF CAPITAL STRUCTURE IN TEHRAN STOCK EXCHANGE LISTED COMPANIES

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## ABSTRACT
*Optimum capital structure is subject of many studies. Current theories about capital structure state that a company with optimum capital structure can increase company's value and shareholders' wealth and decrease capital cost. This study intends to determine effective elements on adjustment speed of capital structure. Descriptive and correlative method was employed in this research. Dependant variables of this study are inflation, internal gross production, bank interest rate, exchange rate and specific features of the company (Tubin's Q, non debt tax shield, growth, assets' yield, working capital, tangibility, size) that had been tested through statistical techniques and multi-variable regression in form of time series data (macro-economic variables) and panel data (specific features of the company). The results indicated that inflation factor and interest rate had meaningful and reverse relation while exchange rate factor had meaningful and positive relation with adjustment speed of capital structure. No meaningful relation was observed between internal gross production and adjustment speed of capital structure. This study also represented that there is a meaningful and reverse relation between specific features of the company (including Tubin's Q ration, non debt tax shield, assets' yield, working capital, and size) and adjustment speed of capital structure and also there is meaningful and direct relation between growth and adjustment speed of capital structure. There is no meaningful relation between the tangibility and adjustment speed of capital structure.*

## KEYWORDS
Adjustment Speed of Capital Structure, Macro-economic Factors, Specific Features of the Company.

## 1. INTRODUCTION
Optimum capital structure is subject of many studies. Current theories about capital structure state that a company with optimum capital structure can increase company's value and shareholders' wealth and decrease capital cost. Adjustment of capital structure shall carry out in consideration of adjustment costs whenever the companies are deviated from optimum capital structure. Theoretical subjects in field of capital structure are seeking such a balance between debt and equity, which are two main financial sources, to maximize company's share value and minimize financing costs. In other words, by increasing share value and decreasing capital costs, the company may acquire a level of efficiency that will subsequently result in shareholders' wealth (as main shareholders) increase, technically referred as optimum capital structure (equilibrium point) (Tehrani, 2012).

## 2. THEORETICAL LITERATURE
Capital structure refers to the manner of combination of company's financing resources including short-term debts, bonds, long-term debts, preferred stocks and common stocks. Some companies have no pre-planned program for their capital structure. Such companies are changing their capital structure only on the basis of financial decisions which are made by financial manager. Although these companies may be successful in short-term performance, they will face considerable problems in supplying required financial resources and may be unable to optimally employ their current resources. Therefore, it is completely clear that a company shall plan its capital structure in a manner to maximize its productivity and more easily adjust its condition in accordance with changing situations (Vakili Fard, 2011).

Nowadays, companies' managers are looking for the methods of financing and decision making in a manner to maximize share market value or in other words maximize the shareholders' wealth. Common shareholders want to receive maximum interest from their primary capital and the lenders expect the company to settle their debts in due dates. Accordingly, the probability of bankruptcy of a company is so important for these two groups. As profitability ratios of the firm is being measured in net profit analysis in comparison with sales income or investments, the actual purpose of the manager is achieving maximum profit for common shareholder. The researcher had selected title of this study considering this requirement and also by performing various library researches and checking different scientific websites and articles in order to study this subject in Iranian capital market.

### 2.2. LITERATURE
Omar Camara (2012) had studies the impacts of macro-economic variables in multinational and domestic corporations on capital structure and adjustment speed during 20 years period from 1991 to 2009 by considering companies' information in Compustat. The results indicated that these variables have important impacts on adjustment speed of capital structure. These results represented that there is a considerable difference between multinational corporations and domestic corporations; multinational corporations are adjusting their capital structures with higher speed in comparison with domestic corporations.

Mangi & Simon Amania (2012) were studies whether Kenyan companies have Optimal Target leverage and are they moving toward. They tried to determine adjustment rate of capital structure in Kenyan companies to optimal target leverage. They investigate Kenyan companies between 1999 and 2010 (12 years period). The results revealed that only 23 companies (among 30 studies companies) had optimal target leverage and a company with 5.3% of deviation from purpose capital structure will need 10 years to achieve its purpose capital structure.

Noorani et al. (2012) investigated the relation between capital structure and capital return of eighteen Iranian banks from 2003 till 2009. The results of model estimate through regression models with panel data indicated that there is a positive relation between financial levels and capital return. Analysis for determining the relation between assets return and capital structure had also developed. The results confirm this hypothesis that there is a positive relation between assets return and capital structure. Positive relation between debt ratio and profitability criteria was another finding of this study. It is noteworthy that profitability had been described in this study as two different criteria of assets return and capital return.

Setayesh & Jahromi (2011) had studied the effects of market competitions on Tehran Stock Exchange listed companies. So, the effects of Tubin's Q ratios and concentration (Herfindal-Hirschman concentration ration of 4) on companies' debt ration. Statistical samples of this study include 86 companies in 8 year period from 2002 till 2009. The results revealed that market competition and capital structure of various industries differs. Moreover, in case of employing Tubin's Q ratio and Herfindal-Hirschman ratio for measuring competition in product market, there is a meaningful and positive relation in product market and companies'

capital structure which confirm game theory. This research also approved non-linear level three relation between Tubin's Q ratio and capital structure. Moreover, after investigating dynamic relation between competition in product market and capital structure, it was revealed that there is purpose capital structure in studies industries with adjustment speed of 45%.

## 3. METHODOLOGY
### 3.1. METHODOLOGY
The method of this research was descriptive correlative with ex-post facto nature. Data gathering is one of the most important parts of every research. The required data for theoretical subjects were collected through library search. For testing the hypotheses of this study, financial data were gathered from stock exchange information.

### 3.2. STATISTICAL POPULATION AND SAMPLE VOLUME
Studied statistical population is Tehran Stock Exchange listed companies which had been in stock exchange list from 2002 till 2011, their fiscal year ended on March 20th of each year and are not among investment companies and banks. Considering these restrictions, final statistical population includes 56 corporations.

### 3.3. DATA GATHERING METHODS AND TOOLS
Information about financial statements and documents of listed companies were gathered from websites of Stock Exchange Organization and Tadbir Pardaz data software while information about macro-economic variables were gathered from different publications of Central Bank including Quarterly National Accounts Special Edition Magazine, Economical Indicators, and also internet website of Central Bank.

### 3.4. RESEARCH QUESTIONS
The main questions that this study aimed to answer them are as follows:
1. Is there any meaningful relation between inflation and adjustment speed of capital structure?
2. Is there any meaningful relation between gross domestic product and adjustment speed of capital structure?
3. Is there any meaningful relation between exchange rate and adjustment speed of capital structure?
4. Is there any relation between bank interest rate and adjustment speed of capital structure?
5. Is there any meaningful relation between specific features of the company and adjustment speed of capital structure?

### 5.3. RESEARCH HYPOTHESES
The researcher had developed following hypotheses in accordance with aforesaid questions:
1. There is meaningful relation between inflation and adjustment speed of capital structure.
2. There is meaningful relation between gross domestic product and adjustment speed of capital structure.
3. There is meaningful relation between exchange rate fluctuations and adjustment speed of capital structure.
4. There is meaningful relation between bank interest rate and adjustment speed of capital structure.
5. There is meaningful relation between specific features of the company (Tubin's Q, non debt tax shield, growth, assets' yield, working capital, tangibility, size) and adjustment speed of capital structure.

### 3.6. RESEARCH VARIABLES AND THEIR CALCULATION METHODS
#### 3.6.1. Dependant Variable
Dependent variable of this study is adjustment speed of capital structure which can be calculated through deducting financial level of current year $BL_t$ from absolute value of ratio with delayed variable pause (financial level of previous year) $BL_{t-1}$. Hereunder is equation for calculating employed ratio in order to compute financial level (Omar Camara, 2012).
(3.1.)

$$\text{the ratio of debt to assets' book value} = \frac{\text{Book value of total debt}}{\text{book value of total assets}}$$

#### 3.6.2. Independent Variable
**Inflation**
According to economics, inflation refers to continued and irregular increase of general prices of goods and services which will result in purchase power and economical chaos. Inflation is increasing and irregular price increase (Azimi Arani, 2008).

**Gross Domestic Product**
Gross domestic product includes total Rials value of final goods and services that are produced by domestic economic units in specific period (annual or quarterly). (Central Bank Website)

**Exchange Rate**
A set of foreign currencies is called exchange. Iranian currency is Rials while all other currencies will be called as exchange (Wikipedia). In this study, inflation rate was calculated by referring to Central Bank website.

**Interest Rate**
Interest is the sum that borrower shall pay to lender for employing his/her financial resources in specific period (Faraji, 2003). In this study, interest rate was calculated by referring to Central Bank website.

**Company's Specific Features**
**Tubin's Q**
Tubin's Q ratio is calculated by dividing market value of all types of company's bonds, long-term debts, and book value of short-term debts on replacement value of company's assets. It is considerable that bonds include common shares, preferred shares and other types of published bonds (Hajiha & Maher, 2010).
In this study, Tubin's Q ratio was calculated by dividing market value of company's assets on book value of them.
(3-2)

$$Q = \frac{COMVAL + SBOWD + STDEBT}{SRC}$$

COMVAL: closing market value of common shares (number of closing common shares multiplied by market value of each share at the end of year)
SBOWD: closing book value of long-term debts
STDEBT: closing book value of debts with less than one year maturity
SRC: closing book value of all company's assets

**Non Debt Tax Shield (NDTS)**
It is clear that payable tax of the company will increase by raise of its taxable income. Therefore, taxable income will decrease by increasing non debt tax shield. Accordingly, tax rate of the company and also expected return from interest tax shield will reduce (Omar Camara. 2012). In this study, tax shield was calculated through following equation (Omar Camara, 2012):
(3-3)

$$\text{Tax Shiled} = \frac{\text{Total Depreciation}}{\text{Total Assets}}$$

**Tangibility**
The company's tangibility may represent agency costs and unorganized financial status. In cases that company owns considerable tangible assets, it will be possible to use them as pledge and decrease the risks of lender debts agency costs. Therefore, company's financial level will increase by increasing its tangible assets (Hang & Sang, 2006).

Tangibility of assets was calculated through following equation (Omar Camara, 2012):

(3-4)

$$\text{Tangibility} = \frac{\text{Net Property, Plant \& Equipment (PPE)}}{\text{Total Assets}}$$

**Size**

Big companies are more varied and have more stable cash flows that this stability is reducing the probability of bankruptcy. Such companies have more bargaining power in employing debts and can decrease exchange costs of long-term debts distribution. On the other hand, big companies may have more varied shareholder which will result in reduced control on company's management. Accordingly, the managers may employ more debts in order to decrease personal loss risk resulted from bankruptcy (Chen & Rager, 2004).

In this study, company's size is calculated through following equation (Omar Camara, 2012):

(3-5)     Size of the Company = Log (Total Assets)

**Growth**

Growth is the other factor that may impact capital structure of the company. According to static balance theory, the companies with future growth occasions will borrow less than the ones with rare growth (the companies with large amount of tangible assets) because growth occasions are categorized as intangible assets that cannot be used as pledge (Chen, 2004).

The growth of companies is calculated through following equation (Omar Camara, 2012) (calculation method is described in attachment 10-3):

(3-6)

$$\text{Growth} = \frac{\text{Market Value of Equity}}{\text{Book Value of Equity}}$$

**Return on Asset (Total Assets/ Net Profit)**

This title is providing an idea about effective management in employing the assets to make profit (Profitable assets) which can be calculated through dividing annual profit on total assets of the company. Return on assets is represented in percentage and sometimes refers to return on investment (Yahyazadehfar & Nabavi, 2010). In this research, return on assets is calculated through following equation (Omar Camara, 2012):

(3-7)

$$\text{Return on Assets} = \frac{\text{Earnings before Interest and Taxes}}{\text{Total Assets}}$$

**Working Capital**

Working capital is an amount of current assets that had been supplied from long-term resources. Gross working capital is total current assets while net working capital is surplus of current assets on current debts. Working capital is an index for determining liquidity and solvency of a company especially in cases that it has been employed in comparison with other indices and financial ratios. Working capital is safety margin of creditor. Companies with borrowing difficulties in short term periods, shall have considerable working capital. Working capital is calculated through following equation (Kouhi & Ahmadi, 2010):

(3-8)     Current Assets – Current Debts = Working Capital

## 4. DATA ANALYSIS

### 4.1. MODEL SPECIFICATION

Partial Adjustment Model was employed in this method. As target leverage cannot be observe directly, Flannery and Rangan methodology (2006) was employed. Purpose capital structure ($BL_t^*$), linear function of macro economical elements (Macro) and company's features (X) are as follows:

(4-1)     $BL_t^* = \beta Macro_t + \varepsilon_t$

(4-2)     $BL_{it}^* = \beta X_{it} + \varepsilon_{it}$

Replacement theory (Trade-off) is predicting that in full capital structure, companies are rapidly adjusting toward target leverage. Spot return to target leverage is equal to zero exchange cost (Hovakimian et al., 2001). Therefore, return to target leverage in defective capital market may happen in various intervals (partial adjustment). Accordingly, partial adjustment model is as follows:

(4-3) $BL_{it} - BL_{it-1} = \gamma(BL_{it}^* - BL_{it-1}) + \varepsilon_{it}$

In (3-8) equation, $\gamma$ coefficient is representing actual changes of capital structure from t-1 to t ($BL_{it} - BL_{it-1}$) while $\gamma$ is between zero and one and is indicating different adjustment periods. $\gamma=1$ represents rapid adjustment or complete adjustment while indicating any deviation from target leverage. It means that target leverage is equal to actual leverage. $\gamma$ may be equal to zero or near zero.

It is expected that $\gamma$ be more than zero and less than one. By displacing equations 8-1 & 8-2 in 8-3, following equations will be resulted that was employed in current study:

(4-4) $BL_t = \gamma\alpha + (1-\gamma)BL_{t-1} + \gamma\beta Macro_t + \varepsilon_t$

(4-5) $BL_{it} = \gamma\alpha_{it} + (1-\gamma)BL_{it-1} + \gamma\beta X_{it} + \gamma\varepsilon_{it}$

The quantitative value of adjustment speed of capital structure can be calculated by deducting financial leverage of current year ($BL_t$) from modulus of coefficient with delayed variable pause (financial leverage of previous year) ($BL_{t-1}$). It is noteworthy that equation (4-7) was estimated through time series method from 2002 till 2011 in quarterly manner while equation (5-7) was estimated through panel data method for 56 companies from 2002 till 2011 in annual manner. Macro economical data were gathered from Iranian Central Bank website.

### 4.2. DESCRIPTIVE STATISTICS OF RESEARCH VARIABLE

The information about descriptive statistics of studies variables are represented in table 4-1.

**TABLE 4-1: DESCRIPTIVE STATISTICS OF EMPLOYED VARIABLES IN MODEL FROM 2002 TILL 2011** (Source: Researcher's findings)

| Variable | Source | Average | Mean | Maximum | Minimum | Standard Deviation | Kurtosis | Skewness |
|----------|--------|---------|------|---------|---------|--------------------|----------|----------|
| CPIR (%) | Central Bank | 3.8 | 3.8 | 8.6 | -1.3 | 1.9 | 0.03 | 3.4 |
| GDPR (%) | Central Bank | 6.8 | 7.04 | 32.4 | -23.4 | 16.7 | -0.006 | 1.6 |
| EXR (Rials) | Central Bank | 9081.4 | 9226 | 10557.67 | 7994 | 798.195 | 2.8 | 13.9 |
| R (%) | Central Bank | 3.38 | 3.2 | 3.62 | 3.25 | 0.1437 | 0.17 | 1.59 |
| BL | 2240 data * | *0.69* | *0.66* | 1.80 | *-0.43* | *0.88* | 5.5 | -13.1 |
| QT | 560 data ** | 1.69 | 1.31 | 10.41 | 0.58 | 1.30 | 4.14 | 23.17 |
| NDTS | 560 data | 0.02 | 0.02 | 0.50 | 0.00 | 0.03 | 11.91 | 214.84 |
| TANG | 560 data | 0.25 | 0.21 | 0.88 | 0.00 | 0.18 | 1.08 | 3.83 |
| SIZE | 560 data | 5.74 | 5.63 | 8.01 | 4.49 | 0.67 | 0.89 | 3.89 |
| GROWTH | 560 data | 3.60 | 2.00 | 39.00 | -6.00 | 4.64 | 4.30 | 24.57 |
| ROA | 560 data | 13.81 | 11.63 | 53.74 | -28.85 | 11.50 | 0.83 | 4.27 |
| WC | 560 data | -283941 | 17992 | 3629770 | -26111525 | 2430392 | -7.83 | 68.53 |
| BL | 560 data | 0.64 | 0.65 | 1.22 | 0.10 | 0.16 | -0.37 | 3.66 |

It is noteworthy that quarterly macro-data were employed in this study.

\* 4 periods in every year during 10 years for 56 companies

\*\* 10 years and 56 companies

**4.3. TESTING NORMAL DISTRIBUTION OF DEPENDANT VARIABLE**

Normality of data especially dependant variable is very important in performing statistical analysis. Therefore, it is necessary to be assured about normal distribution of dependant variable before testing research hypotheses and estimating the parameters and perform required procedures to normalize them (including conversion). In this study, Kolmogorov-Smirnov test was employed to test normality of data. Zero hypothesis and alternative hypothesis in this test are as follows:

$H_0$: Normal distribution

$H_1$: Not Normal Distribution

If statistic probability be less than 5% (sig<0.05), $H_0$ will be failed. As we employed a time series model, quarterly ratios of financial leverage were employed. Accordingly, Kolmogorov-Smirnov test shall be performed for quarterly debt ration to test normal distribution. The results of this test are represented in table (2-4) which are indicating normal distribution of dependant variable.

**(4-2 ) One-Sample Kolmogorov-Smirnov Test**

|    | N | Normal Parameters | | Most Extreme Differences | | | Kolmogorov-Smirnov Z | Asymp. Sig. (2-tailed) |
|----|---|------|---------------|----------|----------|----------|-------------------|------------------------|
|    |   | Mean | Std. Deviation | Absolute | Positive | Negative |                   |                        |
| bl | 2240 | .6564 | .25109 | .136 | .133 | -.136 | .975 | .298 |

**4.4. INVESTIGATING CONSISTENCY OF MACRO-ECONOMICAL VARIABLES (Panel Unit Root Test)**

In this section, consistency test was performed on all time series. In cases that time series are not consistent, it will be impossible to use unit root test because of appearance of spurious regression. Augmented Dickey-Fouler (ADF) Test (which is used in this section) is one of the most common tests for determining unit root in time series. If the F statistic be less than Mac Kinnon critical values, $H_0$ will be accepted. The results of employing variables in this pattern and subtracting their first order are represented in table (4-3). The results indicated that augmented Dickey-Fouler statistic is more than critical value which means that all of them are consistent.

**TABLE 4-3: CONSISTENCY OF MACRO-ECONOMICAL VARIABLES** (Source: Researcher's Findings)

| Variable | ADF Statistic | Mac Kinnon Critical Value in 5% Stage | Consistent Status |
|----------|---------------|----------------------------------------|-------------------|
| D(CPIR)  | -7.67         | -2.94                                  | Consistent        |
| D(GDPR)  | -22.9         | -2.94                                  | Consistent        |
| D(BL)    | -7.81         | -2.94                                  | Consistent        |
| D(R)     | -6.33         | -2.94                                  | Consistent        |
| D(EXR)   | -5.61         | -2.94                                  | Consistent        |

D: indicates subtraction of variables first order.

**4.5. INVESTIGATING CONVERGENCY OF MACRO-ECONOMICAL VARIABLES**

The results of calculating cointegration vectors (according to maximum Eigen value test and impact test) are represented in tables (4-4) & (4-5); maximum Eigen value test and impact test are confirming the existence of four cointegration vectors that impact value statistic and maximum Eigen value are bigger that related critical values.

**TABLE 4-4: DETERMINING NUMBER OF COINTEGRATION VECTORS IN ACCORDANCE WITH IMPACT TEST** (Source: Researcher's Findings)

| Zero Hypothesis | Impact Statistic | Critical Value 95% | Probability |
|-----------------|------------------|--------------------|-----------|
| None *          | ***109.94        | 60.06              | 0.00      |
| At most 1 *     | ***62.27         | 40.17              | 0.00      |
| At most 2 *     | ***33.28         | 24.28              | 0.00      |
| At most 3       | **13.61          | 12.32              | 0.03      |
| At most 4       | 0.56             | 4.13               | 0.52      |

**\*\*\*** Meaningfulness with 99% probability

** Meaningfulness with 95% probability

Result: existence of four cointegration vectors

**TABLE 4-5: DETERMINING NUMBER OF COINTEGRATION VECTORS IN ACCORDANCE WITH MAXIMUM EIGEN VALUE TEST** (Source: Researcher's Findings)

| Zero Hypothesis | Impact Statistic | Critical Value 95% | Probability |
|-----------------|------------------|--------------------|-----------|
| None *          | ***47.67         | 30.44              | 0.00      |
| At most 1 *     | ***28.99         | 24.16              | 0.01      |
| At most 2 *     | **19.67          | 17.80              | 0.03      |
| At most 3       | **13.05          | 11.22              | 0.02      |
| At most 4       | 0.56             | 4.13               | 0.52      |

**\*\*\*** Meaningfulness with 99% probability

** Meaningfulness with 95% probability

Result: existence of four cointegration vectors

**4.6. ESTIMATING THE MODEL – ANALYZING THE RELATION BETWEEN ADJUSTMENT SPEED OF CAPITAL STRUCTURE AND MACRO-ECONOMICAL FACTORS**

Table (4-6) is indicating the results of estimating adjustment speed of capital structure considering macro-economical factors on the basis of equation (4-8) which had been performed through Generalized Method of Moments (GMM) method.

In studies model, J-stat statistic is 4.24 and instrument rank and number of estimated coefficients are respectively equal to 14 & 6. Accordingly, it is possible to identify Sargan test. This test was distributed by $\chi(p - \kappa)$ that $\kappa$ is number of estimated coefficients and $p$ is number of instrument rank.

Therefore, P-value of Sargan statistic $\chi(4.24,14) = 0.89$ was calculated by employing Eviews software that zero hypothesis shall be confirmed with 95% of probability. In other words, employed tools had required validity.

In table (4-6); financial leverage coefficient of one period before (BL(-1) is equal to 0.46 that according to previous descriptions if we deduct this figure from one, adjustment speed of capital structure will be resulted in consideration with macroeconomics shocks. Therefore, γ = 0.54 represents relatively high adjustment speed of capital increase. The relation between adjustment speed of capital structure and macro-economical variables is represented in this model. The model is estimated through following equation:

$$BL_t = \propto_0 + \propto_1 BL_{t-1} + \propto_2 BL_{t-1}{}^*CPIR_t + \propto_3 BL_{t-1}{}^*GDPR_t + \propto_4 BL_{t-1}{}^*EXR_t + \propto_5 BL_{t-1}{}^*R_t + \varepsilon_t$$

$BL_{t-1}{}^*CPIR_t$: is product of multiplying adjustment speed of capital structure by inflation rate which is indicating bilateral relation between these two variables. $BL_{t-1}{}^*GDPR_t$: represents reciprocal relation between gross domestic product growth rate and adjustment speed. $BL_{t-1}{}^*EXR_t$: is indicating the reciprocal relation between adjustment speed of capital structure and exchange rate while $BL_{t-1}{}^*R_t$ represents same relation between bank deposits interest rate and adjustment speed. Hypotheses numbers 1 to 4 of this study are investigating the relation between macro variables and adjustment speed.

It is noteworthy that the results of Sargan statistic in estimated model revealed that selected tools are valid in a way that no meaningful correlation was found between the tools and results.

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**TABLE 4-6: THE RESULTS OF ADJUSTMENT SPEED OF CAPITAL STRUCTURE WITH MACRO VARIABLES – EQUATION NO. 4-7** (Source: researcher's findings)

| Variable | | Model | | Confirm/Reject | Type of Relation |
|---|---|---|---|---|---|
| | | Coefficient | Statistic t | | |
| Y-Intercept | | 0.60 | ***32.2 | | |
| Financial leverage of previous period | BL(-1) | 0.46 | **2.46 | | |
| Inflation rate | BL(-1)*CPIR | -0.01 | **-2.13 | Confirm | Negative |
| Gross domestic product | BL(-1)*GDPR | 0.0002 | 0.33 | Reject | - |
| Exchange rate | BL(-1)*EXR | 9.12 E-6 | **2.49 | Confirm | Positive |
| Bank interest rate | BL(-1)*R | -0.11 | **-2.37 | Confirm | Negative |
| R-squared | | 0.27 | | | |
| D-W | | 2.04 | | | |
| Instrument rank | | 14 | | | |
| J-stat | | 4.24 | | | |
| Sargan Test (P-Value) | | 0.89 | | | |

*** Meaningfulness with 99% reliability, ** meaningfulness with 95% reliability, * meaningfulness with 90% reliability in estimation period which is from 2002 till 2011.

Model – Generalized Method of Moments (GMM)

$H_0$ of Sargan test state that employed tools have no relation with the results. Source: researcher's findings

**Estimated form of the model by employing Eviews software shall be as follows:**

$$BL_t - 0.46BL_{t-1} = 0.60 - 0.01\mathbf{CPIR}_t{}^*BL_{t-1} + 0.0002\mathbf{GDPR}_t{}^*BL_{t-1} + 9.12E..6\mathbf{EXR}_t{}^*BL_{t-1} - 0.11\mathbf{R}_t{}^*BL_{t-1}$$

$$\quad (2.46) \qquad\qquad (32.2) \qquad\qquad (-2.13) \qquad\qquad (0.33) \qquad\qquad (2.49) \qquad\qquad (-2.37)$$

**4.7. INVESTIGATING THE STABILITY OF COMPANY'S SPECIFIC FEATURES (Panel Unit Root Test)**

In this study, stability test was performed on all time series before estimating data panel. Most of economical time series were instable with mostly falsified regressions. This test was performed on all variables of estimated models. The results of this test are represented in table (4-7). The figures in parentheses reveal the probability of Levin statistic which is smaller than 0.05 and rejects zero hypothesis of existence of unit root among the variables. All variables were in a stable status; therefore there were no need for fulfilling cointegration tests and the model has no falsified regression.

**TABLE 4-7: RESULTS OF UNIT ROOT TEST OF VARIABLES** (in company's features level)

| Variable | Unit Root Test | Level | Status |
|---|---|---|---|
| BL | Levin et al | -9.7(0.0) | Stable |
| T-Q | Levin et al | -38.8(0.0) | Stable |
| TANG | Levin et al | -5.4(0.0) | Stable |
| SIZE | Levin et al | -13.4(0.0) | Stable |
| Growth | Levin et al | -35.4(0.0) | Stable |
| Wc | Levin et al | -7.7(0.0) | Stable |
| ROA | Levin et al | -12.4(0.0) | Stable |
| NDTS | Levin et al | -5.92(0.0) | Stable |

The figures in parentheses are the smallest figures for first level error which will result in rejection of $H_0$ (P-value).

Source: researcher's findings.

**4.8. ESTIMATING THE MODEL – INVESTIGATING THE RELATION BETWEEN ADJUSTMENT SPEED AND COMPANY'S FEATURES**

Table 7 estimates adjustment speed of capital structure through equation (5-8) by employing GMM panel method. This table is investigating the relation between adjustment speed of capital structure and company's features that are represented in second and third columns.

❖ The results of table (4-8) indicate that financial leverage coefficient of one period before BL(-1) is equal to 0.21 which is meaningful. By deducting absolute value of coefficient of delayed dependant variable $BL_{it-1}$ from one (1- $\gamma$), adjustment speed of capital structure coefficient by considering company's features will be equal to 0.79 ($\gamma$=0.79) which indicates high adjustment speed of capital structure. This model was estimated as follows:

$$BL_{it} = \propto_0 + \propto_2 BL_{it-1} + \propto_3 BL_{it-1}{}^*QT_{it} + \propto_4 BL_{it-1}{}^*NDTS_{it} + \propto_5 BL_{it-1}{}^*Growth_{it} + \propto_6 BL_{it-1}{}^*ROA_{it} + \propto_7 BL_{it-1}{}^*TANG_{it} + \propto_8 BL_{it-1}{}^*SIZE_{it}$$
$$+ \propto_9 BL_{it-1}{}^*WC_{it} + \varepsilon_{it}$$

$BL_{it-1}{}^*X_{it}$: is the result of multiplying adjustment speed of capital structure by company's features which indicates reciprocal relation between them. Hypothesis no. 5 refers to the relation between company's features and adjustment speed. Therefore, after calculating adjustment speed of capital structure in this model, its relation with other variables was investigated. It is noteworthy that adjustment speed of capital structure in model with company's features is higher than hat was estimated in model with macro factors. It reveals that although considerable changes were occurred in macro-economical variables such as inflation, economical growth (GDP growth), interest rate and exchange rate, financial leverage is inclined to expected leverage (ideal financial leverage) with slower speed and macro-economical fluctuations will have more stable impacts on adjustment speed of capital structure and companies status. However, changes in specific features of the company will result in higher speed of declination of financial leverage to target leverage. It is noteworthy that the results of Sargan statistic in estimated model represent the validity of selected tools in a manner that no meaningful correlation was observed between tools and results.

**TABLE 4-8: ESTIMATING THE IMPACTS OF COMPANY'S FEATURES ON ADJUSTMENT SPEED OF CAPITAL STRUCTURE** (Source: researcher's findings)

| Variable | | Model | | Confirm/Reject | Type of Relation |
|---|---|---|---|---|---|
| | | Coefficient | Statistic t | | |
| Y-Intercept | | 0.38 | ***14.30 | | |
| Financial leverage of previous period | BL(-1) | 0.21 | ***4.77 | | |
| Tubin | BL(-1)*QT | -0.05 | **-2.33 | Confirm | Negative |
| Tax Shield | BL(-1)*NDTS | -0.75 | ***-2.95 | Confirm | Negative |
| Growth | BL(-1)*GROWTH | 0.03 | ***4.72 | Confirm | Positive |
| Assets Return | BL(-1)*ROA | -0.01 | ***-11.28 | Confirm | Negative |
| Working Capital | BL(-1)*WC | -9 -0.6.8e | ***-2.68 | Confirm | Negative |
| Tangibility | BL(-1)*TANG | 0.005 | 0.06 | Reject | - |
| Size | BL(-1)*SIZE | -0.05 | *-1.92 | Confirm | Negative |
| R-squared | | 0.79 | | | |
| D-W | | 1.78 | | | |
| Instrument rank | | 71 | | | |
| J-stat | | 44.03 | | | |
| Sargan Test (P-Value) | | 0.96 | | | |

*** Meaningfulness with 99% reliability, ** meaningfulness with 95% reliability, * meaningfulness with 90% reliability in estimation period which is from 2002 till 2011.

Model – Generalized Method of Moments (GMM)

$H_0$ of Sargan test state that there is no relation between employed tools and the results.

**Estimated form of the model by employing Eviews software shall be as follows:**

$$BL_t - 0.21BL_{t-1} = 0.38 - 0.05QT_t^*BL_{t-1} - 0.75NDTS_t^*BL_{t-1} + 0.03GROWTH_t^*BL_{t-1} - 0.01ROA_t^*BL_{t-1} - 6.8E - 9CC_t^*BL_{t-1} + 0.005TANG_t^*BL_{t-1} - 0.05SIZE_t^*BL_{t-1}$$

**4.9. RESULTS OF TESTING THE HYPOTHESES**

The first hypothesis of this study was tested to reveal whether there is meaningful relation between inflation and adjustment speed of capital structure. In accordance with results, $BL_{t-1}^*CPIR_t$ coefficient is equal to -0.01 and t statistic is equal to -2.13 which indicate meaningful relation between adjustment speed of capital structure $BL_{t-1}$ and inflation rate $CPIR_t$ with 95% of probability. Accordingly, inflation increase will result in adjustment speed decrease which in agreement with expectations and confirm first hypothesis stating the existence of meaningful relation between inflation and adjustment speed of capital structure. These results were in conformity with the results of Omar Camara (2012), Kook & Teng (2010), and Hakbars (2006) researches.

Second hypothesis was tested to investigate probable meaningful relation between gross domestic product and adjustment speed of capital structure. According to results, $BL_{t-1}^*GDPR_t$ coefficient was equal to 0.0002 and the statistic was 0.33 which has limited degree of meaningfulness. Therefore, second hypothesis did not confirm. The results were in contradiction with the results of Kook & Teng (2010) while no other similar cases were found.

Third hypothesis was tested to indicate whether there is meaningful relation between exchange rate and adjustment speed of capital structure. As the results revealed, $BL_{t-1}^*EXR_t$ coefficient was positive and t statistic was equal to 2.49 which is meaningful. So, third hypothesis which questioned the meaningful direct relation between exchange rate and adjustment speed of capital structure was confirmed. These results are concordant with the results of Kook & Teng (2010) and Hakbars (2006) researches.

Hypothesis number four questioned the meaningful relation between bank interest rate and adjustment speed of capital structure. The results of testing this hypothesis showed that $BL_{t-1}^*R_t$ coefficient is negative and t statistic is equal to 2.37 which are meaningful with 95% of probability and interest rate increase will result in adjustment speed decrease. Thus, there is meaningful and reverse relation between bank deposit interest rate and adjustment speed of capital structure. The results are similar as Omar Camara (2012), Kook & Teng (2010), and Hakbars (2006) studies.

The fifth and last hypothesis was tested to investigate the existence of meaningful relation between company's specific features (Tubin's Q, non debt tax shield, growth, assets' yield, working capital, tangibility, size) and adjustment speed of capital structure. The results of unit root test revealed that ADF statistic of both company's features and adjustment speed of capital structure were smaller than 5% which rejects zero hypothesis based on existence of unit root between variables. In it noteworthy that all variables were in stable status and there were no need for performing cointegration tests and the model had no falsified regression.

# 5. DISCUSSION

Assessing the variables and testing the hypotheses of this study revealed that the changes and fluctuations of macro-economical variables are impacting adjustment speed of capital structure and generally impact operations of the companies. Also, desirable or undesirable economical status may considerably impact the companies (their commercial activities). Accordingly, any changes in these factors shall be controlled and supervised by governments in order to improve national commercial and economical activities.

On the other hand, assets return is one of the most important parameters that are impacting adjustment speed of capital structure or financing decisions. The companies are recommended to be more careful in valuation of their assets.

# 6. RESEARCH RECOMMENDATIONS

**6.1. THE RECOMMENDATIONS IN RELATION WITH RESEARCH HYPOTHESES**

1. As per the results of the research, about the four first hypotheses, the financial managers are recommended to notify the positive impact of exchange rate and bank deposits and also negative impacts of interest rate and inflation on capital structure in making decision about financial status and combining financial resources of required cash amounts; and also investigate the changes of these variables.
2. According to the results of testing fifth hypotheses, companies and financing institute managers are recommended to consider this issue by performing more up to date and comprehensive assessments. The companies shall also be more careful in valuation of their assets.

**6.2. SUGGESTIONS FOR FUTURE RESEARCHES**

1. The researchers of political issues are recommended to investigate economical boycotts in their future studies and also inspect other factors which are affecting adjustment speed of capital structure of Tehran Stock Exchange listed companies including commercial risk, and research and development costs.
2. It is also recommended to investigate the effects of other macro-economical factors such as real variables (oil price, deposit, tax rate) and monetary variables (liquidity volume, consumer's price index) in future studies.
3. The upcoming researches shall study longer time period (20 years) to achieve more precise results about calculating adjustment speed of capital structure.
4. This study can be fulfilled while focusing on various industries and their specific features.
5. Considering the importance of debts in determining optimum structure of capital and increasing shareholders' wealth, the authorities of capital market are recommended to provide an organized market for distributing debt bonds of public joint stock companies.

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