



# The Relationship between capital structure, free cash flow, diversification and firm performance

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## ARTICLE INFO

### Article history:

Received 06 Jun 2016

Received in revised form 10 Jul 2016

Accepted 24 Jul 2016

### Keywords:

Capital structure,  
Free cash flow,  
Diversification,  
Firm performance

## ABSTRACT

**Objective:** This study investigated whether there are inter-relationships among capital structure (financial leverage), free cash flow, diversification and firm performance. **Methodology:** To this, 78 active firms in this area were selected between 2011 and 2015. Internal independent variables involve capital structure, free cash flow, diversification and firm performance. To study inter-relationships of variables, simultaneous equation system and STATA software were applied. **Results:** Results indicated that a positively significant relation exists between free cash flow and firm performance in 95% level of significance. There is a negatively significant correlation between capital structure and free cash flow in 95% level of significance. Between free cash flow and diversification, a negative and significant relation exists, with 90% level of significance. And, a bi-directional relation exists between capital structure and firm performance in 90% level of significance. There is no bi-directional relation between diversification and firm performance. **Conclusion:** Finally, according to results, capital structure and diversification have no bi-directional relation.

## 1. Introduction

Since Modigliani and Miller's (1958) seminal paper, the choice between debt and equity has been extensively investigated in the finance literature. As Weston (1981) mentioned, however, there is wide disagreement over what determines the choice of capital structure and how this choice affects firm performance. Conversely, Barton and Gordon (1987) argued that a corporate strategy perspective on managerial choice would yield a more detailed understanding of capital structures and their effects. Andrews (1971) claimed that capital structure decisions are made based on managerial perspectives on the value of the firm in terms of internal and external business factors. This is referred to as the "Strategy-Capital structure" relationship. This concept implies that corporate capital structure and strategic behavior are more accurately understood through a holistic approach that brings together corporate strategic perspectives and extant financial research. Following the "Strategy-Capital structure" argument, the current study jointly examined the inter-relationships among capital structure, free cash flow, diversification and firm performance. To date, these factors have been analyzed separately in prior finance and strategic management research. Although the previous literature carefully examined the relationships among them, it does not provide consistent results due to a failure to examine critical corporate strategy and finance factors. Thus, a holistic approach including "Strategy-Capital structure" could make it possible to estimate the complicated associations among these four critical factors. Consequently, a holistic analysis may also provide more sophisticated results as compared to the separate examinations in prior studies.

### 1.1 Review of literature

What are effective factors on capital structure? This is one the most frequent and challenging questions in financial issues of large firms. Most of Modigliani and Miller (1958) and Myers (1984) studies considered features of special firms (such as profitability, transparency, size) or countries and

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DOI: <https://doi.org/10.24200/jmas.vol4iss04pp22-31>

industrial effects as a leverage to capital structure. Our analysis over these information show that firms are orienting towards this target. It is hypothesized that managers or selves defines rational policies by which capital structure clarifies a long-term objective. Capital structure is commonly permanent (Gill et al., 2008). In past, people relied just on financial information for locating investment places, but after collapse of mega companies like Enron and WorldCom concerning not disclosing financial scandals of managers, investors paid more attention over approaching structure. On the other hand, after separation of legal personality of commercial agencies from real personality of these agencies, the problem of multiple owners appeared and multi-share firms created. In this process, stockholders who have more penetration in firms try to orient financial decisions of firms.

Decision about capital structure and its experimental analysis and choice between debt and right of shareholders depend on specific characteristics of institute. This is a very hard process. Recognizing theory of capital structure can help managers to reach ideal capital structure for maximizing wealth of shareholders. In this course, the aim of this study in considering capital structure is debt leverage (debt ratio) and rights of shareholders.

Excessive free cash flow allows managers to pursue personal goals, regardless of stockholder value. Richardson (2006) defined free cash flow as cash flow beyond what is necessary to maintain assets and finance expected new investments. Under agency theory, if a firm has excessive free cash flows, managers tend to invest the extra cash in new projects, even if a negative net present value (NPV) is anticipated. Such an over-investment of free cash flows would deteriorate firm value. Dechow et al. (2008), showed that firms retaining excessive cash flows had lower future performances. Even though cash flow itself has a positive effect on firm growth, free cash flow has a negative influence on firm growth. Reducing managerial discretion reduces agency costs and, in turn, increases firm value. Thus, debt financing can further restrain over-investment behaviors.

Cash flow has vital role in many of financial decisions, models of valuing securities, methods of evaluating investment plans and many other areas. Information related to cash flow lakes it possible optimal administration of organizational affairs and leads in making ideal decisions in the field of operations, investments and financing.

In theoretical framework of financing which provides objectives of financial reports, a special attention is on cash flow and its anticipation. Firm should be able to provide enough cash to meet its financial promises. Free cash flow is one of measuring criterion of commercial performance. It shows cash flow which firm possesses for expanding assets. Free cash flows are of significant applications for shareholders in assessing financial health of commercial entity. Moreover, managers can enter cash flows in plans with positive NPV and promote value of their investments.

According to Jensen, if managers who are looking for growth of their firms, instead of investing free cash flows in projects with negative value and managing profits to remove losses resulted from bad investments, distribute these cash flows among stockholders will finally face with more benefits for stockholders and firm itself.

To date, not many studies have been done concerning free cash flows. Almost all studies in Iran for free cash flows emphasize on their role in profit management; but, there is no point towards factors meditating this incentive.

Free cash flow is the cash money through strengthening of it managers can promote the value of their firms. To evaluate firm performance by free cash flow, first effective factors on it have to be identified, including net profit, friction expenditures of visible and invisible assets, capital expenditures, dividing profit, financing cost, income tax and etc. firms with higher free cash flows are more ideal for investors and creditors. This optimality is acceptable when firm has passed development phase and has no chance of highly profitable investments. In contrast, some firms may face with negative free cash flow. This negative free cash flow is not always destructive, and managers ought to search the real reason of reaching this point. Rumelt (1982) identified that related diversification produces superior performance than unrelated diversification. This led in many studies. The rational behind Rumelt argument is rooted in economies of scale and the synergy hypothesis. From this perspective, unrelated diversification requires certain substantial costs derived from new and unfamiliar business environment, which could adversely deteriorate firm value. However, the internal market efficiency hypothesis suggests that unrelated diversification performs better. This hypothesis indicates that diversified firms can allocate their sources in a better method, so their performance would improve through reduction of capital expenditure and optimal investment.

There is some evidence regarding reduction of diversification through comparison of commercial segments in diversified firms with private firms. Reduction resulting from diversification points to performance reduction. One effective factor in this process is improper allocation of resources by management, which ruins value of firm. Some scholars stated that this reduction results from internal nature of diversification. Some believe this reduction is the cause of firm's objective. For example, Berger and Ofek (1995) found that unrelated segments of diversified firms overinvesting in low-q industries resulted in a higher diversification discount. Several empirical studies found consistent results with the free cash flow hypothesis in accounting for the diversification discount. Thus, agency theory provides a theoretical rationale for why a diversification strategy might benefit managers but result in the erosion of firm value.

Today, distribution of owners in stock firms makes it impossible to consider them in a traditional framework. Shareholders of these firms have just the right of using some parts of firm incomes based on their shares. This shows conflicts of owners and managers. The final result is nothing but destroying ownership right of shareholders. Shareholders of joint-stock companies are distributed according to interests of managers. In effect, first signs of dominance of managers on firms are appeared. Therefore, it seems reasonable that firms in which shareholders have more shares face with much better firm performance.

Capital market is of vital role in economy of countries. This market acts as index of economical growth. Therefore, considering this market and its fundamental bases are necessary. Surely, the objective of investors in investing in every firm is appropriate return of money. Evaluating performance in the course of making decision is so crucial in financial economy.

## 1.2 Research background

Park and Jang (2013), investigated inter-relationships of capital structure, free cash flow, diversification and firm performance using a holistic perspective. Results indicated that reduction of unrelated diversification is not created by free cash flow; rather, it occurs through self-diversifying function. Free cash flow increases related and unrelated reduction of diversification. This rejects the hypothesis that reduction in diversification is performed by over-investment of free cash flow. The very study identified that debt to assets ratio or debt leverage is an effective method for lowering cash flow and

promoting firm performance. For firms with unrelated diversification, debt leverage directly reduces negative effects of unrelated diversification on firm performance. This, also, indirectly lowers the level of unrelated diversification through free cash flow.

Ben-Moussa and Chichti (2011), concluded that, based on Jensen's free cash flow theory (1986), debt policy as the primary managing mechanism is able to restrict danger of free cash flow.

Gompers et al. (2010), studied the relation between capital structure and firm performance. Results show that firms with institutional managing regime have much better performance, more efficient value and stock return.

Wang (2010), experimentally examined the relation between free cash flow and agency costs; then, he studied the effect of both variables on performance of Taiwanese firms. Considering the overall assets flow and ratio of operational costs to sale, his study found evidence validating agency theory. That means agency costs have negatively significant effect over operational performance and firm's stock return. In contrast, results indicated that a positive and significant relation exists between free cash flow and firm performance's criteria. This manifests lack of enough evidence for validating free cash flow theory.

Doukas and Kan (2004), discussed the relation between free cash flow and diversification in non-financial firms. Findings suggest that there is direct relation between homogeneous and heterogeneous diversification and free cash flow.

Jensen (1986) was the first person who, considering in mind the problem agency theory, proposed free cash flow theory. Finance criteria, such as profit of every share, is not enough to decide and evaluate firms' performance, so it would be better to use cash criteria in parallel.

Tehrani and Hasarzadeh (2010), utilizing information of Stock Exchange firms between 2001 to 2007, investigated the relation between free cash flow and over-investment and also relation between financial provision limitation and low-investment. They found that there is statistically a significant relation between free cash flow and over-investment.

## 2. Materials and methods

### 2.1 Research hypotheses

H1: There is a significant relation between free cash flow and firm performance.

H2: There is a significant relation between capital structure and free cash flow.

H3: There is a significant relation between free cash flow and diversification.

H4: There is a bi-directional relation between capital structure and firm performance.

H5: There is a bi-directional relation between diversification and firm performance.

H6: There is a bi-directional relation between capital structure and diversification.

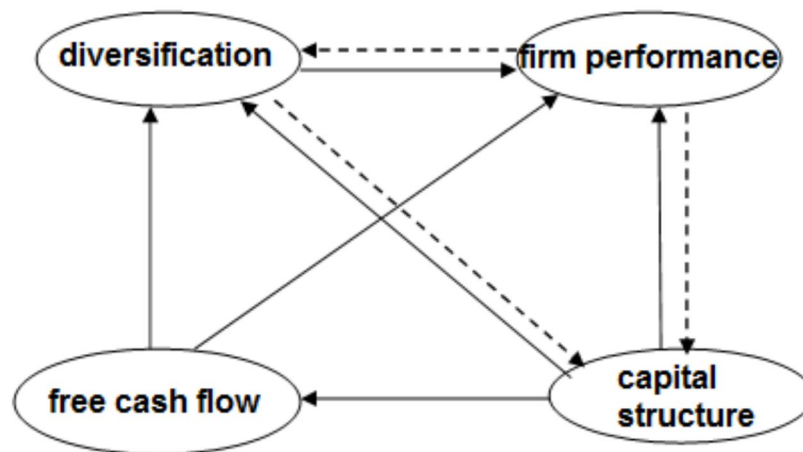


Figure 1. Research conceptual model (Park and Jang, 2013)

### 2.2 Methodology

The present study is applicational and uses correlational descriptive-survey method of gathering data. To collect data for measuring variables, financial reports of firms and different software with information of firms working in Stock Exchange were applied, including Rahavard-e-Novin. Simultaneous equation system and STATA software were used to process information and validate hypotheses.

#### 2.2.1 Statistical society and sample

The statistical society consisted of selected firms working in Tehran Stock Exchange having the following features:

1. They have entered in Tehran Stock Exchange since 2011 and were active till the end of 2015.
2. Accounting information from financial reports of firms is available for the given period.
3. Their shares have been transacted at least every three months.
4. They are not among brokery and financial firms.

5. Their fiscal year is 19th of March.

Based on these items, 78 firms were selected as samples from Tehran Stock Exchange between 2001 and 2007.

## 2.2.2 Variables and model of research

### 2.2.2.1 Internal independent variables

Main variables include firm performance (Tobin's Q), capital structure (debt leverage), diversification and free cash flow. These variables are considered internal in the model.

Firm performance (Tobin's Q):

It is the ratio of the market value of the firm divided by the replacement value of assets, which is calculated following Himmelberg et al. (1999) method.

$$Tobin's Q_{i,t} = \frac{\text{market value of the firm}}{\text{replacement value of the assets}} \quad (1)$$

Market value of the firm is measured as the market value of common equity plus the market value of preferred stock plus the book value of total liabilities.

Replacement value of assets is the book value of total assets.

Capital structure (debt leverage) (TDLi,t):

It is measured as total debts divided by book value of all assets.

$$TDLi, t = \frac{\text{total debts}}{\text{total assets}} \quad (2)$$

Diversification (Entropy i,t):

To measure diversification of firms, entropy is used. So, total diversification a firm can be calculated as follows:

$$E = \sum_{i=1}^n z_i \ln\left(\frac{1}{z_i}\right) \quad (3)$$

where,

$Z_i$  is the total sale of firm in business line of i

- If a firm works exclusively in one line of business, its entropy is zero.
- For a firm, if 20 different lines of business expand equally, entropy is around 3.

Free cash flow (FCF i,t):

This function is measured as follows:

$$FCF_{it} = (INC_{it} - TAX_{it} - INTEP_{it} - CSDIV_{it}) / A_{i,t-1} \quad (4)$$

where,

$FCF_{it}$  is free cash flow in ith firm in t year.

$INC_{it}$  is operational profit before friction of firm ith in t year.

$TAX_{it}$  is the total paid tax of ith firm in t year.

$INTEP_{it}$  is the cost of paid profit in ith firm in t year.

$CSDIV_{it}$  is the profit of ordinary shareholders of ith firm in t year.

$A_{i,t-1}$  is the total book value of assets of ith firm in t-1 year.

### 2.2.2.2 Control variables

Sales\_GR<sub>i,t</sub>: net sales growth divided by net sales of previous year

$$Sales\_GR_{i,t} = \frac{\text{net sales } i, t - \text{net sales } i, t-1}{\text{net sales } i, t-1} \quad (5)$$

Ln (Sales) i,t: net sales changed to logarithm for ith firm in t year.

PPNE  $i,t$ : logarithm of fixed assets divided by all assets.

$$PPNE_{i,t} = \ln \left( \frac{\text{property, plant and equipment}}{\text{all assets}} \right) \quad (6)$$

ln (CAPX)  $i,t$ : capital expenditures

M/B: market value divided by book value

### 2.2.2.3 Proposed models and method of analysis

To jointly measure relations between capital structure, free cash flow, diversification and firm performance, 2SLS (Two-Stage Least Square) regression was applied. Testing equations are as follows:

Model (1):

$$TOBINSQ_{it} = \beta_0 + \beta_1 TDL_{it} + \beta_2 FCF_{it} + \beta_3 ENTROPY_{it} + \beta_4 SALES\_GR_{it} + \beta_5 \ln(SALES)_{it} + \epsilon_{it} \quad (7)$$

Model (2):

$$TDL_{it} = \beta_0 + \beta_1 TOBINSQ_{it} + \beta_2 ENTROPY_{it} + \beta_3 \ln(CAPX)_{it} + \beta_4 \ln(SALES)_{it} + \epsilon_{it} \quad (8)$$

Model (3):

$$FCF_{it} = \beta_0 + \beta_1 TDL_{it} + \beta_2 \ln(SALES)_{it} + \beta_3 M/B + \epsilon_{it} \quad (9)$$

Model (4):

$$ENTROPY_{it} = \beta_0 + \beta_1 TOBINSQ_{it} + \beta_2 TDL_{it} + \beta_3 FCF_{it} + \beta_4 PPNE_{it} + \beta_5 \ln(SALES)_{it} + \epsilon_{it} \quad (10)$$

In these equations:

Tobin's Q  $i,t$ : firm performance for  $i$ th firm in  $t$ th time

FCF  $i,t$ : free cash flow of  $i$ th firm in  $t$ th time

Entropy  $i,t$ : diversification of  $i$ th firm in  $t$ th time

TDL  $i,t$ : financial leverage for  $i$ th firm in  $t$

Sales-GR  $i,t$ : net sales growth

ln (Sales)  $i,t$ : logarithm of net sales

PPNE  $i,t$ : logarithm of fixed asset to all assets

ln (CAPX)  $i,t$ : capital expenditures

M/B: market value divided by book value

## 3. Discussion and results

### 3.1 Results

#### 3.1.1 Descriptive statistics

Descriptive statistics calculate society parameter and include central indices, society distribution and so on. In table 1, descriptive statistics of research variables are presented, including mean, medium, maximum, minimum and standard deviation.

Table 1. Descriptive statistics of research variables

| Variable | Mean   | Medium | Maximum | Minimum | Standard deviation | Observations |
|----------|--------|--------|---------|---------|--------------------|--------------|
| TOBINSQ  | 1.7571 | 1.4450 | 7.6700  | 0.6600  | 0.9349             | 390          |
| TDL      | 0.6424 | 0.6200 | 3.0600  | 0.1500  | 0.3016             | 390          |
| FCF      | 0.0895 | 0.0800 | 0.8200  | -0.8000 | 0.1905             | 390          |

|           |         |         |         |          |        |     |
|-----------|---------|---------|---------|----------|--------|-----|
| ENTROPY   | 0.3124  | 0.3000  | 0.9600  | 0.0000   | 0.2608 | 390 |
| SALES-GR  | 0.2403  | 0.2000  | 2.7300  | -0.9300  | 0.3432 | 390 |
| LN(SALES) | 13.8374 | 13.7000 | 18.9400 | 10.3200  | 1.4564 | 390 |
| LN(CAPX)  | 5.4314  | 5.3200  | 7.7700  | 3.6300   | 0.7323 | 390 |
| M/B       | 2.6224  | 2.2250  | 12.8200 | -14.7300 | 2.6612 | 390 |
| PPNE      | -0.7099 | -0.6900 | -0.0700 | -2.4200  | 0.3828 | 390 |

### 3.1.2 Matrix of variables' correlations

In table below, level of correlation between variables is shown, in and for example, correlation coefficient between firm performance (TOBINSQ) and free cash flow (FDF) is 0.344, with  $\text{sig} \leq 0.01$ .

**Table 2. Matrix of variables correlations**

|           |                     | TOBINSQ | TDL     | FCF    | ENTR<br>OPY | SALES_<br>GR | LN<br>(SALES) | LN<br>(CAPX) | M/B  | PPNE |
|-----------|---------------------|---------|---------|--------|-------------|--------------|---------------|--------------|------|------|
| TOBINSQ   | Pearson Correlation | 1       |         |        |             |              |               |              |      |      |
|           | Sig. (2-tailed)     |         |         |        |             |              |               |              |      |      |
|           | N                   | 390     |         |        |             |              |               |              |      |      |
| TDL       | Pearson Correlation | -.042   | 1       |        |             |              |               |              |      |      |
|           | Sig. (2-tailed)     | .406    |         |        |             |              |               |              |      |      |
|           | N                   | 390     | 390     |        |             |              |               |              |      |      |
| FCF       | Pearson Correlation | .344**  | -.696** | 1      |             |              |               |              |      |      |
|           | Sig. (2-tailed)     | .000    | .000    |        |             |              |               |              |      |      |
|           | N                   | 390     | 390     | 390    |             |              |               |              |      |      |
| ENTROPY   | Pearson Correlation | -.075   | -.013   | .026   | 1           |              |               |              |      |      |
|           | Sig. (2-tailed)     | .138    | .798    | .614   |             |              |               |              |      |      |
|           | N                   | 390     | 390     | 390    | 390         |              |               |              |      |      |
| SALES_GR  | Pearson Correlation | .255**  | -.046   | .276** | -.018       | 1            |               |              |      |      |
|           | Sig. (2-tailed)     | .000    | .369    | .000   | .719        |              |               |              |      |      |
|           | N                   | 390     | 390     | 390    | 390         | 390          |               |              |      |      |
| LN(SALES) | Pearson Correlation | -.146** | -.004   | .078   | .242**      | .117*        | 1             |              |      |      |
|           | Sig. (2-tailed)     | .004    | .942    | .126   | .000        | .020         |               |              |      |      |
|           | N                   | 390     | 390     | 390    | 390         | 390          | 390           |              |      |      |
| LN(CAPX)  | Pearson Correlation | -.126*  | -.115*  | .110*  | .113*       | .040         | .491**        | 1            |      |      |
|           | Sig. (2-tailed)     | .013    | .023    | .030   | .026        | .429         | .000          |              |      |      |
|           | N                   | 390     | 390     | 390    | 390         | 390          | 390           | 390          |      |      |
| M/B       | Pearson Correlation | .624**  | -.197** | .263** | -.013       | .131**       | -.011         | -.033        | 1    |      |
|           | Sig. (2-tailed)     | .000    | .000    | .000   | .804        | .009         | .826          | .512         |      |      |
|           | N                   | 390     | 390     | 390    | 390         | 390          | 390           | 390          | 390  |      |
| PPNE      | Pearson Correlation | .049    | -.164** | .110*  | -.098       | .082         | -.037         | .481**       | .062 | 1    |
|           | Sig. (2-tailed)     | .334    | .001    | .029   | .054        | .108         | .466          | .000         | .223 |      |
|           | N                   | 390     | 390     | 390    | 390         | 390          | 390           | 390          | 390  | 390  |

\*\*. Correlation is significant at the 0.01 level (2-tailed).

\*. Correlation is significant at the 0.05 level (2-tailed).

### 3.1.3 Results of simultaneous equation system

Results of running simultaneous equation system with 2SLS regression are shown in table 3.

**Table 3. Summary of statistical results of firm performance test using 2SLS regression**

|           | Coefficients | Standard deviation | t statistics | level of significance |
|-----------|--------------|--------------------|--------------|-----------------------|
| B0        | -4.3118      | 4.8742             | -0.88        | 0.376                 |
| TDL       | 11.7581      | 6.0639             | 1.94         | 0.052                 |
| FCF       | 25.4297      | 8.8566             | 2.87         | 0.004                 |
| ENTROPY   | -2.9145      | 4.7020             | -0.62        | 0.535                 |
| SALES-GR  | -0.5877      | 1.1597             | -0.51        | 0.612                 |
| LN(SALES) | -0.1957      | 0.2065             | -0.95        | 0.343                 |

|                          |  |
|--------------------------|--|
| 1 <sup>st</sup> equation | $TOBINSQ_{it} = \beta_0 + \beta_1 TDL_{it} + \beta_2 FCF_{it} + \beta_3 ENTROPY_{it} + \beta_4 SALES\_GR_{it} + \beta_5 LN(SALES)_{it} + \varepsilon_{it}$ |
| Observations             | 390  |
| X <sup>2</sup>           | 273.12   |
| significance             | 0.0000   |

Concerning 273.12 for X2 and significance of 0.0000, it can be claimed that fitted regression model is significant.

**Table 4. A Summary of statistical results of capital structure test using 2SLS regression**

|                          | Coefficients   | Standard deviation | t statistics | level of significance |
|--------------------------|--|--------------------|--------------|-----------------------|
| B0                       | 1.0144   | 0.2694             | 3.77         | 0.000                 |
| TOBINSQ                  | -0.1089  | 0.0302             | -3.60        | 0.000                 |
| ENTROPY                  | 0.1529   | 0.8530             | 0.18         | 0.858                 |
| LN(CAPX)                 | -0.1124  | 0.0734             | -1.53        | 0.126                 |
| LN(SALES)                | 0.0276   | 0.0638             | 0.43         | 0.665                 |
| 2 <sup>nd</sup> equation | $TDL_{it} = \beta_0 + \beta_1 TOBINSQ_{it} + \beta_2 ENTROPY_{it} + \beta_3 LN(CAPX)_{it} + \beta_4 LN(SALES)_{it} + \varepsilon_{it}$ |                    |              |                       |
| Observations             | 390  |                    |              |                       |
| X <sup>2</sup>           | 28.55  |                    |              |                       |
| significance             | 0.0000   |                    |              |                       |

Concerning the amount of 28.55 for X2 and significance of 0.0000, it can be stated that fitted regression model is significant.

**Table 5. Summary of statistical results of free cash flow test using 2SLS regression**

|                          | Coefficients  | Standard deviation | t statistics | level of significance |
|--------------------------|---|--------------------|--------------|-----------------------|
| B0                       | 0.2043  | 0.1046             | 1.95         | 0.051                 |
| TOBINSQ                  | -0.4319   | 0.1141             | -3.78        | 0.000                 |
| ENTROPY                  | 0.0100  | 0.0047             | 2.15         | 0.032                 |
| LN(CAPX)                 | 0.0092  | 0.0036             | 2.56         | 0.010                 |
| LN(SALES)                | 0.2043  | 0.1046             | 1.95         | 0.051                 |
| 3 <sup>rd</sup> equation | $FCF_{it} = \beta_0 + \beta_1 TDL_{it} + \beta_2 LN(SALES)_{it} + \beta_3 M/B + \varepsilon_{it}$ |                    |              |                       |
| Observations             | 390   |                    |              |                       |
| X <sup>2</sup>           | 74.12   |                    |              |                       |
| significance             | 0.0000  |                    |              |                       |

Concerning the amount of 74.12 for X2 and significance of 0.0000, it can be stated that fitted regression model is significant.

**Table 6. Summary of statistical results of diversification test using 2SLS regression**

|                          | Coefficients  | Standard deviation | t statistics | level of significance |
|--------------------------|---|--------------------|--------------|-----------------------|
| B0                       | -1.1316   | 0.6066             | -1.87        | 0.062                 |
| TOBINSQ                  | 0.1648  | 0.1081             | 1.52         | 0.127                 |
| TDL                      | 0.4909  | 0.4998             | 0.98         | 0.326                 |
| FCF                      | -1.3370   | 0.7533             | -1.77        | 0.076                 |
| PPNE                     | 0.0644  | 0.0874             | 0.74         | 0.461                 |
| LN(SALES)                | 0.0726  | 0.0227             | 3.20         | 0.001                 |
| 4 <sup>th</sup> equation | $ENTROPY_{it} = \beta_0 + \beta_1 TOBINSQ_{it} + \beta_2 TDL_{it} + \beta_3 FCF_{it} + \beta_4 PPNE_{it} + \beta_5 LN(SALES)_{it} + \varepsilon_{it}$ |                    |              |                       |
| Observations             | 390   |                    |              |                       |
| X <sup>2</sup>           | 13.94   |                    |              |                       |
| significance             | 0.0160  |                    |              |                       |

Concerning 13.94 for X2 and significance of 0.0160, it can be claimed that fitted regression model is significant.

### 3.2 Results of research hypotheses:

First hypothesis: coefficient of FCF variable in table 3 presents a positively significant correlation between free cash flow and firm performance, with 0.05 level of error. Since p-value for this variable is less than 0.05, so H0 is rejected and H1 is accepted. Therefore, it can be stated that a positively significant relation exists between free cash flow and firm performance, with 98% level of significance.

Second hypothesis: coefficient of TDL variable in table 5 presents a negatively significant correlation between capital structure and free cash flow, with 0.05 level of error. Since p-value for this variable is less than 0.05, so H0 is rejected and H1 is accepted. Therefore, it can be stated that a negatively significant relation exists between capital structure and free cash flow, with 98% level of significance.

Third hypothesis: coefficient of FCF variable in table 6 presents no significant correlation between free cash flow and diversification, with 0.05 level of error. Since p-value for this variable is more than 0.05, so H0 is accepted and H1 is rejected. Therefore, it can be stated that no relation exists between free cash flow and diversification, with 95% level of significance. But with some negligence, coefficient of FCF variable presents a negatively significant correlation between free cash flow and diversification, with 0.10 level of error. Since p-value for this variable is less than 0.10, so H0 is rejected and H1 is accepted. Therefore, it can be stated that a negatively significant relation exists between free cash flow and firm performance, with 90% level of significance.

Fourth hypothesis: coefficient of TDL variable in table 3 presents no significant correlation between capital structure and firm performance, with 0.05 level of error. Since p-value for this variable is more than 0.05, therefore, it can be stated that no relation exists between capital structure and firm performance, with 95% level of significance. But with some negligence, coefficient of TDL variable presents a negatively significant correlation between capital structure and firm performance, with 0.10 level of error. Since p-value for this variable is less than 0.10, therefore, it can be stated that a negatively significant relation exists between capital structure and firm performance, with 90% level of significance.

On the other hand, coefficient of TOBINSQ variable in table 4 presents a negatively significant correlation between capital structure and firm performance, with 0.05 level of error. Since p-value for this variable is less than 0.05, so H0 is rejected and H1 is accepted. Therefore, it can be stated that bi-directional relation exists between capital structure and free cash flow, with 90% level of significance.

Fifth hypothesis: coefficient of ENTROPY variable in table 3 presents no significant correlation between diversification and firm performance, with 0.05 level of error. Since p-value for this variable is less than 0.05, therefore, it can be stated that no significant relation exists between diversification and firm performance, with 95% level of significance.

On the other hand, coefficient of TOBINSQ variable in table 6 presents no significant correlation between firm performance and diversification, with 0.05 level of error. Since p-value for this variable is less than 0.05, so H0 is accepted and H1 is rejected. Therefore, it can be stated that no bi-directional relation exists between diversification and firm performance.

Sixth hypothesis: coefficient of TDL variable in table 6 presents no significant correlation between capital structure and diversification, with 0.05 level of error. Since p-value for this variable is less than 0.05, therefore, it can be stated that no significant relation exists between capital structure diversification, with 95% level of significance.

On the other hand, coefficient of ENTROPY variable in table 4 presents no significant correlation between capital structure and diversification, with 0.05 level of error. Since p-value for this variable is less than 0.05, so H0 is accepted and H1 is rejected. Therefore, it can be stated that no bi-directional relation exists between capital structure and free cash flow.

### **3.3 Results of control variables of study:**

#### **3.3.1 Results of table 3:**

The measured coefficient of SALES-GR variable in table 3 presents no significant correlation between net sales and firm performance, with 0.05 level of error. Since p-value for this variable is less than 0.05, therefore, it can be stated that no significant relation exists between net sales and firm performance, with 95% level of significance.

The measured coefficient of LN (SALES) variable in table 3 presents no significant correlation between logarithm of net sales and firm performance, with 0.05 level of error. Since p-value for this variable is less than 0.05, therefore, it can be stated that no significant relation exists between logarithm of net sales and firm performance, with 95% level of significance.

#### **3.3.2 Results of table 4:**

The measured coefficient of LN (CAPX) variable in table 4 presents no significant correlation between capital expenditures and capital structure, with 0.05 level of error. Since p-value for this variable is less than 0.05, therefore, it can be stated that no significant relation exists between capital expenditures and capital structures, with 95% level of significance.

The measured coefficient of LN (SALES) variable in table 4 presents no significant correlation between net sales and firm performance, with 0.05 level of error. Since p-value for this variable is less than 0.05, therefore, it can be stated that no significant relation exists between logarithm of net sales and capital structure, with 95% level of significance.

#### **3.3.3 Results of table 5:**

The measured coefficient of LN (SALES) variable in table 5 presents a positively significant correlation between logarithmic net sales and free cash flow, with 0.05 level of error. Since p-value for this variable is less than 0.05, therefore, it can be stated that a positively significant relation exists between net sales and firm performance, with 95% level of significance.

The measured coefficient of M/B variable in table 5 presents a positively significant correlation between market value to book value and free cash flow, with 0.05 level of error. Since p-value for this variable is less than 0.05, therefore, it can be stated that a positive and significant relation exists between market value to book value and free cash flow, with 95% level of significance.



### 3.3.4 Results of table 6:

The measured coefficient of PPNE variable in table 6 presents no significant correlation between logarithmic fixed assets to all assets and diversification, with 0.05 level of error. Since p-value for this variable is less than 0.05, therefore, it can be stated that no significant relation exists between logarithmic fixed assets to all assets and diversification, with 95% level of significance.

The measured coefficient of LN (SALES) variable in table 6 presents a positive and significant correlation between logarithmic net sales and diversification, with 0.05 level of error. Since p-value for this variable is less than 0.05, therefore, it can be stated that a positively significant relation exists between logarithmic net sales and diversification, with 95% level of significance.

**Table 7. General results of study**

| Item                       | Definition of hypothesis   | Result                            |
|----------------------------|--|-----------------------------------|
| 1 <sup>st</sup> hypothesis | There is a significant relation between free cash flow and firm performance.       | positive and significant relation |
| 2 <sup>nd</sup> hypothesis | There is a significant relation between capital structure and free cash flow.      | negative and significant relation |
| 3 <sup>rd</sup> hypothesis | There is a significant relation between free cash flow and diversification.        | negative and significant relation |
| 4 <sup>th</sup> hypothesis | There is a bi-directional relation between capital structure and firm performance. | accepted                          |
| 5 <sup>th</sup> hypothesis | There is a bi-directional relation between diversification and firm performance.   | rejected                          |
| 6 <sup>th</sup> hypothesis | There is a bi-directional relation capital structure and diversification.          | rejected                          |

## 4. Conclusion

### 4.1 Analysis and conclusion

In clarifying the first hypothesis, it can be stated that there is a positively significant correlation between free cash flow and firm performance, with 95% level of significance. So, increasing free cash flow leads in promotion in the ability of management for gaining profits from available sources. This, in turn, can increase output of assets directly related to management performance. On the other hand, rise in free cash flow contributes in some opportunities through which manager would be able to promote output of shareholders. Therefore, promotion in free cash flow is an effective factor to help management to increase value of firm. According to above results, promotion in free cash flow, which is related to efficiency of managers' operations, helps in increase in revenues and profitability. Increase in profits leads in rising of stock price. Then, both stock output and value of firm (influenced by value of stock exchange market) would catapult.

In clarifying the second hypothesis, it can be mentioned that there is a negatively significant correlation between capital structure and free cash flow, with 95% level of significance. Concerning that one of the instruments for evaluating debt return and determining financial flexibility of firms is free cash flow indicator, investors and creditors are prone to invest in companies having high level of free cash flow. This ideal high level of free cash flow is acceptable when a firm has passed early stages of development and lacks any more chance of highly profitable investments. In contrast, some firms face with negative free cash flow. This negative flow is not inconvenient all times. The main issue is identifying causes of this negative orientation and should be studied clearly. If this negativeness results from the fact that gross operational profit goes negative after reduction of tax, undoubtedly, this negative orientation is destructive, because firm may face with operational problems. But, if this negativeness of free cash flow is the result of investing in profitable opportunities and applying a variety of sources in operational capital items for permanent development, then, it will not have any problem, since it is occasionally and relates to short-term investments. Profitability is gained in long-term opportunities, so, free cash flow obtains a positive aspect.

In stating the third hypothesis, as it can be found from findings, there is a significant relation between free cash flow and variety, with 90% level of significance. Investors are trying to evaluate profits and free cash flow in companies they have invested in. The reason is to judge about identical investments through considering future cash profits and value of stocks. Investments which are not capable of maximizing revenues of shareholders, finally, lead in both reduction in price of stocks and motivating shareholders to dismiss board of directors and senior executive manager. This process lowers variety of stocks. Therefore, in order for managers to conceal these kinds of investments, free cash flows are applied to promote profits and presenting an ideal financial performance.

In terms of the fourth hypothesis, there is a two-way relation between capital structure and firm performance. Capital structure is important for companies concerning tax advantages; because, the more the amount of debt in capital structure, the less the level of tax debt and the more cash flow after tax. Jensen and Meckling (1976) studied two main kinds of agency costs. The first one is recognized by differences between interests of management and shareholders, through mismanagement of sources by director for increasing personal welfare. This results in many expenses. Therefore, using more guaranteed debt contributes in lowering expenses of agencies and growing their performance. The second kind of agency costs comes from conflicts of shareholders and creditors. Since debt contract gives this chance to shareholders to reach more profits from success of investment projects, and in case of failure, creditors can't return even their primary debt, therefore, creditors are expected to impose higher financial provisions to firm. This process leads in negative effect of capital structure on firm's performance, especially when the firm uses much debt in its capital structure.

In clarifying the fifth and sixth hypotheses and their rejection, it can be mentioned that other factors determining capital structure of companies operating in Tehran Stock Exchange, such as commercial risk, growth and etc, should be studied. In terms of variety, the required infrastructures and prerequisites in stock companies should be constituted to reach more reliable results.

#### 4.2 Recommendations

Regarding results and findings, the following items can be applied in appropriate contexts:

- Following results of the first hypothesis concerning a positively significant correlation between free cash flow and performance, companies, instead of trying to reduce free cash flow, ought to implement proper approaches for controlling behaviors of managers in order to utilize surplus cash profits for more optimized ways, such as development of new products, implementing operations, paying cash profits to shareholders and returning debts. So, it is recommended to pay more attention to the role of effective supervision or disciplinary measures. This is because, in case of shortage of these measures, managers may misuse cash profits for personal interests.
- Concerning results of the second hypothesis about a negatively significant correlation between capital structure and free cash flow, it can be said that generally, free cash flow is an indicator capable of envisaging a better picture of flexibility of firm to creditors and shareholders. In their view, a firm is ideal when possesses high free cash flow, since this firm can apply its assets for operations, distributing profits of stocks, return of debts and expansion of profitable unit. A conservative manager who attempts for increasing profits of shareholders should invest in highly profitable opportunities. It is proposed to managers to study lifespan of their firms and put more attention over investments and consequences of free cash flow. Moreover, it is recommended to Tehran Stock Exchange, as the supervisor of firms and responsible of compiling accounting and auditing standards, to disclose required information in terms of capital structure and free cash flow of companies for better exploitation of financial reports.
- Based on results of the third hypothesis, there is a negatively significant correlation between free cash flow and variety; then, since increase in the level of free cash flow can have important effects on decision of investors, presenting clear and complete information by management concerning free cash flow and variety is highly influential. Concerning that investors are looking for companies having a high level of free cash flow, this contributes in some limitations on freedom and ability of managers to invest in a variety of profitable projects. Therefore, managers have to consider long-term policies of companies and accommodate their financial policies with them.
- Based on results of the fourth hypothesis, there is a bi-directional relation between capital structure and firm performance. So, it is recommended that companies apply debt leverage in their capital structure for better performance, because, on the basis of findings, there is a positive and significant relation between debt leverage and performance.

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#### How to Cite this Article:

Shahjahani R., Bokharayan M., The Relationship between capital structure, free cash flow, diversification and firm performance, *Uct Journal of Management and Accounting Studies* 4(4) (2016) 22–31.