

Studying the Variations in Ratio of Capital Resources toward the Equity Return in Tehran Stock Exchange

Zahra Rahmati¹, Amin Noshadi², Shahroch Bozorgmehrian³

1. Department of Accounting, Abdanan Branch, Islamic Azad University, Abdanan, Iran

2. Department of Accounting, Dehloran Branch, Islamic Azad University, Dehloran, Iran

³ Department of Accounting, Masjed Soleyman Branch, Islamic Azad University, Masjed Soleyman, Iran
z_rahmatia@yahoo.com

Abstract: The increase in shareholders' wealth from the leverage of debts is an important principle that forces the managers of the companies to pay enough attention to the time of the financing. Financial experts look for an optimized combination of the capital to maximize the company's value and consequently, to maximize the shareholders' wealth. In this regard, they have considered the effects of tax-savings from interests of debts and the low rate of debts costs in comparison to other capital resources. Some theories have been proposed in this regard that mainly focus on the positive effects of using leverage of debts in increasing the shareholders' wealth. This research intends to investigate the effects if financing on the equity turnover of the active companies in Tehran Stock Exchange. In this regard, the companies who have used loans or capital increase as a financing way in a 5-year interval have been selected. The effects of two mentioned financing methods (loans and capital increase) on the ratio of their equity turnover have been tested on the basis of their financial reports. The results show that the ratio of total assets to the equity (leverage intent) is significant among the group of companies that have received debts and the group of companies that have increased their capital; but the ratio of equity turnover and the ratio of total assets, and the ratio of net profit to sales is not significant among the two groups of the companies. In other words, getting the loan by the active companies in Tehran Stock Exchange has not led to create a desirable financial leverage.

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1. Introduction

When they need new financial resources, the companies can borrow or they can transfer a part of their ownership. When deciding about new financial resources, the companies have to specify the costs of different sources of financing methods and determine the effects of each sources will put on their efficiency and their operational risks. Using proper methods of financing for profitable projects can play an important role in increasing the shareholders' wealth. The increase of shareholders' wealth is the final goal of profit associations. To gain more benefits and to increase the shareholders' wealth through changing the combination of capital structure, especially using borrowings for long-term periods is a solution for the companies to achieve their goals.

Some financial experts believe that the company's value depends on the management performance not on its capital structure. They believe that making proper decisions about investments (and not making wise decisions about financing) can lead to gain more benefit and to increase in the shareholders. In contrast, most financial experts are persuaded that paying enough attention to tax savings due to the costs of debt interests and the low rate of debt costs in comparison to other sources will lead to

the increase of company's value and the increase in shareholders' wealth by using debts in their long-term financing. Accordingly, the companies have to make a balance between the values of tax saving of interest and the different costs of bankruptcies; i.e. the regulation of debt ratio has to be done in a way that maximizes the company value.

Indeed, these experts look for reaching the final goal of the company (i.e. maximization of shareholders' wealth) through decreasing the costs (i.e. minimization of financing costs). According to this theory, if the company can resort to tax savings, then it will be better for the company to use borrowing for its financing. Obviously, the company has to limit the rate of its debts due to the probable costs of financial crises or disorders. This research intends to investigate the effects if financing on the equity turnover of the active companies in Tehran Stock Exchange.

2. Literature review

One of the first researches on capital structure is David Durand's 1952 research. Then in 1958, two financial professors (Franco Modigliani and Merton Miller) published an article that was the beginning point of wide discussions due to its theory on capital structure (known as MM theory) so that in addition to

Modigliani and Miller's own articles on 1959, 1963, 1965, 1966, and 1969, several other researchers wrote articles to confirm or criticize MM theory, among which one can refer to David Durand (1959), Fred Weston (1963), Dawson, Breuer and Jacob (1965), Himms and Sprengel (1969), R. C. Merton (1969), and Jack Baker (1978).

Modigliani and Miller first (1958) believed that the manner of capital structure has no effect on the company's value but later (1963) they accepted that tax savings due to debt interests will lead to increase in company's value; accordingly they suggested the companies to use maximum debts in the combination of their financial sources.

In 1976, in a research on the capital structure in US, Scott and Martin showed that the type of the industry is a determining and effective factor on the national structure of the companies.

Rimmers (1975) studied a big-size sample of active companies in 9 different industries of 5 countries. The results showed that in France and Japan, financial structure is significant among different industries while in US, Netherlands and Norway such a difference between the industries is not significant. In yet another research on a sample of Railway companies, Warner (1977) concluded that the current value of debt bankruptcy costs is less than the increase of the value due to the debts. Briley and Jarikom (1984) in their research on the desirable capital structure studied the effective factors on the financial structure of the companies. In this regards, the studied the effects of the main factors like trade risks on the financial structure of the companies. The results of this research that was conducted on 80 companies showed that the type of the industry has an important effect in the ratio of company's debts. Additionally, Anderson (1990) studied the relationship between the financial structure of the companies and their technology. He concluded that the capital-based companies have a higher ratio of debts than the work-based companies.

3. Hypotheses of the research

The profitability ratios measure the success of beneficiary units in gaining the net efficiency to the sales income or to the investments. Undoubtedly, the goal of the management is to gain maximal efficiency for the investments of shareholders in any beneficiary unit. Thus the rate of equity is the best criterion for

assessing the success of beneficiary units in achieving the mentioned goal. The main question this research is going to answer is whether the financing methods have any effect on the ratio of equity of active companies of Tehran Stock Exchange.

Referring to above- mentioned discussions, the main hypothesis of the research can be defined as follow: Financing methods affect the ratio of the equity return.

The ratio of the equity return is obtained by division of net profit on the total equity. Few decades ago, DuPont Company offered a method for analyzing financial statements that is called DuPont system. According to DuPont system, the ratio of the equity return is the result of combining three other ratios. These three ratios include the ratio of sales income to total assets, the ratio of total assets to the equity, and the ratio of net profit to the sales income. Accordingly, three subsidiary hypotheses can be proposed as follow:

- Financing methods affect the ratio of sales income to total assets;
- Financing methods affect the ratio of total assets to the equity;
- Financing methods affect the ratio of net profit to the sales income

4. Methodology

Conducting such a research requires gathering financial information of active companies in Tehran Stock Exchange. It is not possible to access such information merely through the financial reports of the companies. The needed information of the research has been collected from the financial reports of the related companies by confirmation of Tehran Stock Exchange Organization. Tehran Stock Exchange officially publishes the financial statements of the accepted companies in weekly, monthly, and annually terms. After data collection completed, we analyzed the data using suitable statistical methods, especially mean central mean.

4.1. Separate data analysis for the companies

In terms of the proposed hypotheses of the research, ratio of the equity return, the ratio of sales income to total assets, the ratio of total assets to the equity, and the ratio of net profit to the sales income are calculated separately. For example, the calculation results for Lamiran Company are shown in table 4.1.

Table 4.1. Sample of information processing

Lamiran Company	3	2	1	0	-1	-2	-3
Ratio of the equity return	0.8015	0.3805	0.3873	0.546	0.4893	0.2356	0.2186
Ratio of sales income to total assets	0.7278	0.6215	0.4959	0.3962	0.5974	0.529	0.5048
Ratio of total assets to the equity	3.6867	2.701	2.4382	2.5377	2.894	4.5886	4.8132
Ratio of net profit to the sales income	0.2987	0.2266	0.3203	0.049	0.2831	0.0971	0.0899

5. Testing hypotheses

5.1. First hypothesis

The first hypothesis was proposed as follow: Financing methods affect the ratio of the equity return.

Its counterpart hypothesis can be proposed as follow: Financing methods don't affect the ratio of the equity return.

In statistical terms, if d_E is the mean of variations of the related ratio among the companies that have financed through capital increase, and if d_D is the mean of variations of the related ratio among the companies that have financed through borrowing, we will have the followings for hypotheses zero (H_0) and hypothesis 1 (H_1) respectively:

$H_0: d_D \neq d_E$
 $H_1: d_D = d_E$

5.2. First stage

In this stage, the variations in post-financing period in comparison to pre-financing period have been studied for each group of the companies (i.e. the comparison of 2 periods of each group with the group itself).

Table 2. Information relating to the mean return of the companies that have increased their capital

Name of the Company	ROI1	ROI2	D=ROI2-ROI1
Alborz Ceramic Co.	2.99	2.851	-0.139
ARJ	0.391	0.076	-0.315
Jam Daru	0.123	0.127	0.004
Motogen	0.1	0.568	0.467
Iranite	0.145	0.484	0.339
Absal	0.84	0.904	0.064
Alborz Carton	0.532	1.019	0.487
Pichak	0.267	0.619	0.352
Sepahan Cement	0.392	0.8	0.408
ARG	0.563	1.381	0.818
Lamiran	0.11	0.135	0.245
Gas and Glasses	0.315	0.523	0.208
Naqshe Iran Industrial Group	0.656	0.761	1.11
Navarde Aluminum	0.448	0.674	0.226
Team Production	0.61	0.943	0.333
Pars Carpet	0.278	0.075	0.203
Shahin Plastic	0.299	0.11	0.189
Pars Daru	0.243	0.533	0.29
Pastiran	0.431	1.35	0.919
Pars Minoo	0.479	0.983	0.504
Shahdiran	1.075	1.148	0.073
BaftAzadi	0.534	0.896	0.362
Tehran Gach	0.427	0.129	0.298
Pars Khazar	0.413	0.342	0.071
Pars Oil	1.238	0.588	0.65
Mean	0.556	0.75	0.194

a) The companies that have had capital increase

Table 2 shows the mean of the ratio of equity return of each company in 3 years leading to financing (column ROI1) and the mean of 3 years after the financing (ROI2) and the variations between

these 2 periods (column D). Additionally, the mean of each group of this information (AVG), variations (VARs) and standard deviation (STDS) are shown in the table.

ROI1: the man of equity return in 3-year period before financing

ROI2: the man of equity return in 3-year period after financing

d_D : return variation in period for each company

VARs: 0.17165 = d variance

STDS: 0.4143 = d standard deviation

b. The companies that have borrowed

ROI1: mean of 3 years before financing, mean of 3 years after financing

Variations of 2 periods for each company and variations' standard deviation

ROI1 = 0.43

ROI2 = 0.674

$d_b = ROI \Delta = 0.244$

STDSd = 0.496

ROI1: mean return ratio of all companies' group before financing

ROI2: mean return ratio of all companies' group after financing

d_D : variations' mean of two periods of whole companies of the group

$$t = \frac{\bar{d}}{sd} = \frac{0.244}{0.4962/\sqrt{14}} = 1/83$$

t is obtained as 1.83, higher than t equal to 1.7709, which means the difference is statistically significant. Therefore the ratio of equity return for the companies that have borrowed after borrowing is higher than before.

5.4. Second stage

First, the equality for variances of two groups of companies are being tested and then the mean of the ratio variations are being compared in this stage.

0.194 = d_E

$VAR_{E=0.172}$

$d_D=0.244$

$VAR_{D=0.246}$

$$F = \frac{VAR_E}{VAR_D} = \frac{0.172}{0.246} = 0.65$$

It can be seen that f is obtained as 0.65 which is lower than the tables value for (13, 24) at the level of 0.1, which was equal to 1.9827. Therefore the

variances of both populations are equal in this level. So t-test is as follows:

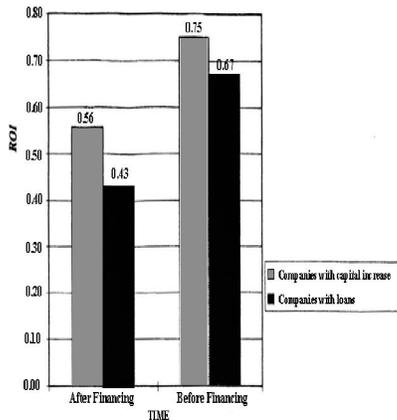
$$t = \frac{d_E - d_D}{SP \sqrt{1/n_E + 1/n_D}}$$

$$SP = \sqrt{\frac{(d_E)VARSE + (n_D - 1)VARSD}{n_E + n_D - 2}}$$

$$t = \frac{0.224 - 0.194}{\sqrt{\frac{246(+13)0/172(246)}{25 + 14 - 2}}}$$

$$t(n_1+n_2-2, a/2) = t(37, 0/05) = 1.6871$$

t calculated as 1.6871 which is higher than the table's value, 0.05. It can be concluded that the difference in the level of 10% is not significant statistically. It means that the increase in ratio of equity return in both groups of the companies is the same. Accordingly H₀ is rejected and its counterpart hypothesis (H₁) is confirmed



5.5. Financial leverage and its application

How are the variations in financial leverage against the variations of pre-interest and pre-tax benefit? To answer this question, it is necessary to calculate the financial break-even point. Financial break-even point is some of pre-interest and pre-tax benefit against which the equity benefit gets zero. Financial break-even point can be defined as follow:

$$EBIT = I + \frac{D_p}{1 - t}$$

Where:

EBIT: pre-tax and pre-interest at financial break-even point

I: interest cost

t: tax rate

D_p: benefit of preferred shares

For example, if the interest cost in Alpha Company is equal to 20 USD and the interest of preferred share is equal to 10 USD, and the tax rate is

equal to 50 USD, then the financial break-even point will be as follow:

$$EBIT = 20 + \frac{10}{50\%} = 40$$

The variations of financial leverage degree can be calculated using Alpha Company assumptions at different levels of pre-tax and pre-interest benefit as follow:

1) EBIT= 10

$$DFL = \frac{10}{10 - 20 - \frac{10}{50\%}} = 0/33$$

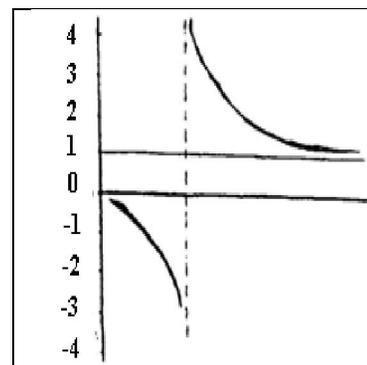


Fig. 1. Variations of financial leverage degree

a) Financial break-even point

Financial leverage degree calculates the percentage of the benefit variations due to 1% variation in pre-interest and pre-tax benefit. But what is the application of this leverage? Using financial average degree, we can: (1) calculate the financial risk rate, and (2) specify the variation of each share against the specified variation of pre-interest and pre-tax benefit.

5.6. Effectiveness of financing methods on the equity return

The ratio of equity return is obtained by dividing post-interest and post-tax benefit to equity:

$$\text{Equity return ratio: } \frac{EBIT - T - I}{S}$$

Where:

EBIT: pre-interest and pre-tax benefit

I: interest cost

T: Tax

t: income tax

S: equities

The effectiveness of financing methods on the benefit (return) of equities can be explained by an example: Suppose Alpha Company needs 500,000 USD. The management of the company expects the return of company's assets to be 24%. In other words, pre-interest and pre-tax benefit of the company will be USD

The company can gain the needed capital through 2 ways:

- Gains the whole amount of the capital by publishing and selling its common stock. The price for each share in the market is 10 USD
- Gains 250,000 USD bank loans with 15% interest rate and gains the remaining over equity.

For simplicity of the subject, it is given that none of the above-mentioned ways has side costs. The effects of these two methods on the ratio of Equity (ROE) can be as shown in table 3.

Table 3. The methods of financing methods on equity return

Explanation	Financing method	
	Just over equity	Loans and common stock
Pre-interest and pre-tax benefit (EBIT)	120,000	120,000
Subtracted: interest cost	-	37,500
Pre-tax benefit	120,000	82,500
Subtracted: tax (60% tax rate)	72,000	49,500
Post-tax benefit	48,000	33,000
Ratio of the benefit to equity	500,000 13.2%	250,000 9.6%

As shown in table 3, when the 50% of the needed capital is gained by borrowing, the rate of equity return is 3.6% more than when the whole capital is gained by selling common stock of the company. The reason of this difference is the tax savings of the interest cost. This issue shows the importance of financial leverage in increasing the capital profitability.

6. Results of hypotheses test

6.1. First hypothesis

Financing methods affect the ratio of the equity return.

According to the results of the test as shown in tables 1.4 and 2.4, calculated t is 0.05 lesser than the t of the table that was equal to 1.687 and this shows that the difference of the two groups is statistically insignificant. Accordingly, the variations of equity return are similar in both groups of the companies and thus financing method has not affected the equity return.

6.2 Second hypothesis

H₀: Financing methods affect the ratio of sales income to total assets.

According to the results of the test as shown in tables 3.4 and 4.4, calculated t is 0.06 lesser than the t of the table that was equal to 1.6871 and this shows that the difference is statistically insignificant. Accordingly, the financing methods do not affect the ratio of sales income to total assets. Thus we can conclude that H₀ is rejected and its counterpart, H₁ is confirmed.

6.3. Third hypothesis

H₀: Financing methods affect the ratio of total assets to the equity.

According to the results of the test as shown in tables 4.5 and 4.6, calculated t is 1.99 bigger than the t of the table that was equal to 1.9624 and this shows that the difference between the two groups is statistically significant. Accordingly, the financing methods do affect the ratio of total assets to the equity. Thus we can conclude that H₀ is confirmed and its counterpart, H₁ is rejected.

6.4. Fourth hypothesis

H₀: Financing methods affect the ratio of net profit to the sales income.

According to the results of the test as shown in related tables, calculated t is 0.186 lesser than the t of the table that was equal to 1.6871 and this shows that the difference is statistically insignificant. Accordingly, the financing methods do not affect the ratio of net profit to the sales income. Thus we can conclude that H₀ is rejected and its counterpart, H₁ is confirmed.

7. Conclusion and suggestions

The results show that the ratio of equity return of the companies of Tehran Stock Exchange is not affected by the financing methods. In other words, the ratio of equity returns of the companies whose whole capital is supplied by their owners is equal to the ratio of equity returns of the companies that have supplied some of their capital through borrowing. Due to the lower cost of borrowed capital, theoretically it is expected that the companies who have used borrowing method to supply all their needed capital have a lesser equity return than the companies whose capital is supplied by their shareholders in part. Understanding the reasons of undesirable usage of financial leverage of Tehran Stock Exchange companies needs more studies.

Referring to the obtained results of the research, the following points are suggested to reach a better understanding of the performance of capital market in Iran:

1. It is necessary to specify the reason or reasons of ineffectiveness of financing methods on the equity return of Tehran Stock Exchange companies.
2. To supply their long term financial resources, the companies have to choice among the different available methods. Thus such companies have to research to specify the decision- making criteria of the managers of the companies and their attitudes.
3. The companies have to investigate the attitudes of the investors and share buyers and their view toward the balance sheet and their acquaintance with such an issue.
4. The companies have to investigate the way of assessment and the decision- making criteria of the financiers (especially the banks) for granting the loans to the companies.
5. It is necessary to research about the way of recording interest costs by the companies that have supplied their needed capital through borrowing and to compare these ways with accounting standards.

Corresponding Author:

Department of **Accounting**,
Islamic Azad University, Branch Dehloran,
Dehloran, iran

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