A Study of the Using G-Score Model in Order to Recognizing Pioneer Companies: 
Iranian Evidence

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Abstract: The outcomes of current study imply to being different of leverage index (capital structure symbol) pertaining to pioneer and unsuccessful companies listed on Teheran Stock Exchange. Moreover, there could not be found any relation between leverage index and effective factors in capital structure containing profitability index, operational leverage, and the size of incorporation. While in unsuccessful corporations, profitability index and leverage index are negatively interrelated and there is no relation between variables of operational leverage and the size of company.

Key words: G-SCORE, Pioneer & unsuccessful corporations, Capital structure, Leverage index.

INTRODUCTION

The financing resources will be divided into two classifications of "internal financing resource" and "external financing resource". In internal financing resource, acquired profit is used for financing that is to say dividends will be applied for mostly operational activities instead of distributing to shareholders. In external financing resources, shares and liabilities will be used for financing. Then, this question will be raised that how could be financing in order to have maximum positive impact on shareholders' dividends and returns?

Are the capital structures of pioneer and unsuccessful corporations different? How could be the optimum capital structure for corporations? Are the capital structures of unsuccessful and pioneer corporations different? Is there any difference between the capital structures of unsuccessful and pioneer corporations (accepted in stock prototype industry companies) with effective factors in above mentioned companies?

In current study, it is tried to optimize the model through classifying all prototype members in two types of pioneer and unsuccessful corporations. As it was mentioned in previous chapters, the subset containing pioneer corporations have different capital structures from unsuccessful ones.

Research Problem:

The aim of current research is to study the related theories with financial structure theoretically and classification of the listed companies in Tehran Stock Exchange (TSE) (Cement and Chemical industries) in to pioneer and unsuccessful corporations in order to survey more important features in Iran country experimentally and finally showing if the offered theories pertaining to financial structures of companies by other countries experts could be workable in our country too. Could our managers consider the above factors? Will the financing sources consider the financial structure in granting funds?

Are the capital structures in pioneer and unsuccessful corporations (accepted in cement industry and chemical products) and effective factors capital structures different?

This research tried to study the effective factors in capital structures classifies the accepted corporations in stock (cement industry and chemical products) in to pioneer and unsuccessful types using G-Score Model, and finally compare the capital structures in both types.

Objective of the Study:

The current research tries to introduce G-Score Model to the shareholders and other users for the purpose of recognizing the pioneer and unsuccessful companies listed on TSE. This model could differentiate these two types, using applied financial indices in corporations' statements analysis along with securities evaluation.

The defining factors of capital structures including internal and external types are introduced and the effective internal factors in capital structures following corporation value will be tested. This should be noted that financial managers are required to take the above mentioned features in to consideration and maximize the corporation value based on them.
**G-Score Model:**
This research applies G-Score Model to recognize the pioneer and unsuccessful corporations in Teheran Stock Exchange. We use 6 independent variables including return of equity interest, return of equity in capital market, profitability of operational income index to the sale, variable of sale growth, ratio of net income to dividend of per shares and current yield of assets.

Each of above variables has either zero or one score G-Score Model. We compute each score based on the following table. For computing independent variable score of G-Score Model, we score 1 if the company index is bigger than industry average rather we score zero, rather it will be zero. Finally the total of above variables will be computed for each company and via them we distinguish those with zero and one scores (first quarter) as unsuccessful and those with five and six scores (fourth quarter) as pioneer incorporation.

**Review of Previous Literature:**
Fama and French, (1992) study the Differences between average stock returns and market risk, the size of the company, financial leverage, equity (book value) and equity (market value) and the proportion of the profit to the price through regression and come to the conclusion that there is no relationship between market risk and the size of the company. Stock returns are inversely related to the book value of the financial leverage and market value; therefore, it has an inverse relationship to the book value of financial leverage and direct relationship to the market value of financial leverage. These relationships are referred to as ‘riddles’ by Fama and French.

Opler and Titman, (1994) examined the relationship between financial pressures and firm performance in unsuccessful industries. They described financial pressures as high financial leverage and firm performance as sales growth and stock returns and operational profit fluctuations in association with the average of operational profit, and considered unsuccessful Industries to be industries whose negative sales growth to stock returns average would be under 30% negative. It is noteworthy that they expected the financial leverage to have a negative impact on firm performance in the above-mentioned industries. Based on the assumptions above the research examined the influence of the variables the firm size, the industry situation and the proportions of the financial leverage to sales growth, stock returns and operational profit the companies using regression and concluded that:

1. Companies with high financial leverage tend to lose a great share of the market, more than the rivals that fund conservatively, also companies with high financial leverage suffer 26% more sales loss, in industries where only the outcome of their contract is considered, than the companies which fund with less financial leverage degrees.

2. High financial leverage has had a positive impact on the operational profit of the companies in unsuccessful industries. To confirm the results, they argue that companies dealing with financial problems take the liabilities to temporarily increase their operational profits.

3. The financial leverage has a negative impact on the income of these companies. For instance, the equity of the companies that had increased the financial leverage by 8 to 10 percent by 11.9% lower than that of the companies that had increased the financial leverage by 1 to 7%. The overall result of this research was that the bad outcomes of more financial leverage were more significant. Harris and Raviv (1991) examined the research addressing capital structure starting with Miller and Modigliani’s (1958) research in three categories: 1) capital structure and agency costs, 2) capital structure and asymmetric information and 3) capital structure and product market reactions. They concluded that most of the researches indicate that stating financial leverage tends to increase the stock price. Finally, they suggested that the researches on capital structure and product market are still preliminary and more research is required in this field.

Maksimov and Zencher, (1991) examined the influence of capital structure on the firm value in various industries and came to the conclusion that in a reasonable situation, capital structure (liabilities) does not reduce the firm value in industry.

Furthermore, without taxes, in spite of its influence on shareholders’ interests, the capital structure is irrelevant for private companies. Considering the tax benefit of liabilities, the capital structure is included in decision makings, except in a condition where companies are indifferent to different levels of liabilities.

Mackay and Phillips, (2001) have studied the influence of industry on capital structure through simultaneous examination of the relationship between the financial leverage. Technology and risk and have presented significant evidence on the industry-based difference in financial leverage of 44 competing American product industries from 1977 to 1990. An analysis of the deviation results shows us that the fixed effects of industry are less important in understanding and analyzing the difference of capital structures of the companies than the fixed effect of the company.

Developing a dynamic model of optimal capital structure, Fisher et al., (1989) examined the amount of the optimal leverage ratio through the regression of a function of the variables firm size, riskability, lower tax category and bankruptcy costs which are the defining variables. They found the result that the excess of the ratio...
of corporate liabilities is highly influenced by the variables the firm size, riskability, lower tax category and bankruptcy costs.

Fernandez, (2001) presented the optimal capital structure using 2 samples recommended by Harvard Business School and Damodaran’s School. Harvard Business School analyzes the relationship between maximizing the stock price and achieving the optimal capital structure considering the maximization of the firm value and the minimization of the balanced average of capital costs.

In this school, as the liabilities increase, so do the costs of financing from liabilities and equity interests and this is due to the fact that the corporate shareholders and creditors are subjected to more risk; therefore, the return of equity ratio (ROE) is positively and significantly associated to liabilities, this means that the more the liabilities, the larger the return of equity ratio will become. This result is in accordance with Modigliani and Miller’s capital structure theory which was laid down in 1963.

According to Modigliani and Miller’s capital structure theory if the company chooses to do a 100 percent self-financing from liabilities the firm value will be maximized. But an increase in the liabilities will slightly reduce the weighted average cost of capital of the company. Otherwise, the weighted average cost of capital will soar.

The Damodaran School consists of a similar business school with the difference that Fernandez applies this approach to a real company and analyzes the relationship between the stock price and the optimal capital structure considering the maximization of the firm value and minimizing the weighted average cost of capital. Furthermore, this school, like the business school demonstrates the positive impact of liabilities over the return of equity ratio.

Therefore, using the above schools, Fernandez measures the cost of each of the financial tools and the expected estimate of return of equity rate and the productivity rates from banks or financial markets, and the firm value in different structures and as a result, the optimal capital structure of 70% of equities and 30% of liabilities maximized the market value of the company.

In their 1991 study entitled: ‘A Capital Structure Literature Review’, Harris and Raviv (1984) stated that the companies in a specific industry have equal shares of assets and liabilities.

For the sake of hypotheses verification, they applied statistical approaches (average, measure deviation, multi variable regression, T-Test, Watson and co-variance) once incorporated for seven industries and once for single industry. They reached to the following outcomes:

1- In incorporated test, the industry type was effective on capital structure while company size, business risk and operational leverage were not effective on that.
2- In single industry test, industry type was effective on chemical & pharmaceutical industries, food and sugar, wood and paper productions, steel production and machineries, cement and studding industries while the variables of company size, business risk and operational leverage were not effective on it.

The results of textile and home appliances were somewhat different comparing with other industries:

A) In textile industry the industry type was effective along with company size while business risk and operational leverage were not effective on financial structures.
B) In home appliance industry, business risk and operational leverage were effective beside industry type while company size was not.

Ghalibafasl (1994) studied the impacts of capital structure (financial leverage) on risk systematic (B) of common stock pertaining to listed companies on Tehran Stock Exchange. He founded that more application of leverage (liabilities) would boost the systematic risk of company shares in stock market.

Mojtahedzade (1998) worked on the advantages of re organizing financial structure. They confronted with 20 new financial structures and classified them into three groups of vertical, horizontal and corporative. Also, they founded that liabilities yielded by tax saving would boost probable decrease of re-investing extra cash flows, increasing motivation, selling low return and improving function, efficiency and company market values.

Research Hypotheses:

Hypotheses One:
The ratio of net income to the sale and leverage index of Cement and Chemical listed companies is negatively interrelated.

Hypotheses Two:
The ratio of net income to the leverage index and degree of functional leverage of Cement and Chemical listed companies is negatively interrelated.

Hypotheses Three:
The leverage index and corporation size (the value of assets market) of Cement and Chemical listed companies is positively interrelated.
**Research Variables:**

1. Return of equity interest (ROE) (return rate of net value): this ratio implies to profitability amount of commercial unit and return of shareholders.
2. Return of dividends (R): is the return of bonus yielded through investment by the investor. Previous section explained it completely.
3. The ratio of operational interest (operational interest to net sale) (OI/S): shows the ability of institution in controlling operational costs and also profit gain in the major activities of incorporation.
4. Sale growth variable (SGV): we use 3 years growth sale variance for computing growth sale rate which enables us to compare growth rates of major and minor companies.
5. Dividend per share to equity per share (DPS/EPS): constitutes the distributed net profit to shareholders. By dividing it to distributed shares to shareholders, we can yield that part of profit assigned by assembly as cash dividend.
6. Market return of assets (MROA): the market return of assets can be computed by multiplying stock market value (the amount of shares multiplied by shares price) plus liabilities values. In other words: present credibility value + (share price × share amount) value market of equity interest = market return of assets that we use Neprin logarithm for comparability of minor and major companies.

Computing and scoring approach of selected variables:

Each of above variables has either zero or one score G -Score Model. We compute each score based on the following table. For computing independent variable score of G -Score Model, we score 1 if the company index is bigger than industry average rather we score zero.

About G OI/S index, we score one if the company index is above the industry average we score 1 if not zero. In independent variable of G SGV, variability of sale growth is the basis of company scoring in research sample in a way that we score one if the variability index growth in last 3 years is less that industry average we score 1 if not zero.

In independent variable of G DPS/EPS, we score one if the company index is above industry average and if not zero.

Finally we score the last selected index in such a way that if the independent variable is above the industry average we score 1, if not zero.

Regarding the mentioned variables, we will have:

\[ G\text{-Score} = G\text{-ROE} + G_R + G\text{-OI/S} + G\text{-SVG} + G\text{-DPS/EPS} + G\text{MROA} \]

**Table 1:** G-S core Model for research indices.

<table>
<thead>
<tr>
<th>Score one</th>
<th>Score zero</th>
<th>G-Score Model</th>
</tr>
</thead>
<tbody>
<tr>
<td>Average industry equity interest &lt; ROE</td>
<td>Average industry Return of equity &gt; ROE</td>
<td>G-ROE</td>
</tr>
<tr>
<td>Average industry Return of equity &lt; R</td>
<td>Average industry Return of equity &gt; R</td>
<td>G-R</td>
</tr>
<tr>
<td>Average industry Operational income to sale &lt; OI/S</td>
<td>Average industry Operational income to sale &gt; OLS</td>
<td>G-OI/S</td>
</tr>
<tr>
<td>Average industry SVG &lt; variance SVG</td>
<td>Average industry SVG &gt; SVG variation</td>
<td>G-SVG</td>
</tr>
<tr>
<td>Average industry DPS/EPS &lt; DPS/EPS</td>
<td>Average industry DPS/EPS &gt; DPS/EPS</td>
<td>G-DPS/EPS</td>
</tr>
<tr>
<td>Average industry Return of assets value</td>
<td>Average industry Return of market assets value</td>
<td>GMROA</td>
</tr>
</tbody>
</table>

Leverage index is key variable and the center of this research. This can be computed by dividing assets liabilities to assets sum.

Independent variables of the study are as follows:

Profitability index: it can be acquired by dividing net profit to sale.

Operational leverage degree: is the percentage of profit variation before interest and tax against 1% variation in sale.

Company size: we use Neprin logarithm of present assets net value for computation of independent variable of company size.

**Research Methodology:**

The descriptive, correlation and regressive approach is applied by researcher for studying the relation between variables.

**Descriptive Research:**

Descriptive research is attributed to approaches with the aim of description of phenomena. The researcher's purpose was objective, real, and ordered description of one situation or subject matter. That is the researcher applying this kind of approach tries to report "what exists" without interference, mentally extraction or manipulation from related situation.
**Data Collection:**
Applied variables in research models required related data gathering. Essential data in this research can be extracted from the current information in TSE and its published software.

**Statistical Community:**
Statistical community is some desired elements with at least one feature. Usually each research has a statistical community in which related researcher tends to study its feature or varied features. As the current research is related to those listed companies on TSE, the statistical community is selected by time scope.

Each scientific research tries to discover generalized principles and could be true in all situations. Though, it is not impossible but requires extensive money. As it is not economical way of study, we can use sampling.

The applied approaches for verification of research hypotheses related to the first hypothesis are variance analysis, F-Fischer, t-Student, Correlation descriptive comparison. For the second hypothesis Regression, correlation coefficient and other related tests are applied.

For testing the second and third model, we use regressive model:

**Model Introduction:**
Whenever the reply variable \( y \) is interrelated with \( k \) independent variable (foresighted), the related regressive model which is named multiple regressive models could be defined as follows:

\[
y_i = \beta_0 + \beta_1 x_2 + \ldots + \beta_k x_{ik} + \varepsilon_i
\]

\( y_i \) indicates the true \( i \) replies, \( x_{i1}, x_{i2}, \ldots, x_{ik} \) are independent variables which are assumed constant and defined.

\( \beta_0, \beta_1, \ldots, \beta_k \) are accounted as model parameters and \( \varepsilon_i \) denotes model error which is assumed independently distributed by zero average and fix variance of \( \sigma^2 \).

For studying the variable dependant relation with independent ones, we can use the following linear multi variable regressive model:

\[
Dratio = a + b_1 NPS + b_2 LOP + LMVA + \varepsilon
\]

Its independent variables are:
NPS: net profit to sale
LOP: operational leverage importance
LMVA: Neprin logarithm of current assets value

**Hypothesis Testing:**
H\(_0\): There is negative relation between leverage index and ratio of net profit to sale between unsuccessful companies in Iran.
H\(_1\): There is not negative relation between leverage index and ratio of net profit to sale between unsuccessful companies in Iran.

- A- Pearson's correlation coefficient test of the following hypothesis is presented in Table 2.

<table>
<thead>
<tr>
<th>Test</th>
<th>Correlation - Pearson</th>
</tr>
</thead>
<tbody>
<tr>
<td>n</td>
<td>54</td>
</tr>
<tr>
<td>r statistic</td>
<td>-0.5</td>
</tr>
<tr>
<td>95% CI</td>
<td>-1 to -0.30</td>
</tr>
<tr>
<td>t statistic</td>
<td>-4.12</td>
</tr>
<tr>
<td>DF</td>
<td>52</td>
</tr>
<tr>
<td>1-tailed p</td>
<td>&lt;0.0001 (t approximation)</td>
</tr>
</tbody>
</table>

As the correlation coefficient is \((-0.50)\) and \( P \) value is less than 5\%, the hypothesis is verified.

- B- Diagram
Below diagram confirms this result.

- C- Spearman's correlation coefficient
Below table implies that Spearman verified this result too.
As it is shown by Diagram 1 and Table 1, the correlation coefficient of net profit and leverage index is (-0.5) in Pearson's correlation coefficient model. Also it can show that $R^2$ amount is (0.46). Hereupon $H_1$ is accepted and $H_0$ is rejected. Also, Table 2 showing the Spearman's correlation coefficient as (-0.36).

$H_0$: There is negative relation between leverage index and degree of operational leverage between unsuccessful companies in Iran.

$H_2$: There is not negative relation between leverage index and degree of operational leverage between unsuccessful companies in Iran.

Testing of the second hypothesis

- A- Pearson's Correlation Coefficient

<table>
<thead>
<tr>
<th>Test</th>
<th>Correlation - Pearson</th>
</tr>
</thead>
<tbody>
<tr>
<td>n</td>
<td>54</td>
</tr>
<tr>
<td>r statistic</td>
<td>-0.01</td>
</tr>
<tr>
<td>95% CI</td>
<td>-1</td>
</tr>
<tr>
<td>t statistic</td>
<td>-0.04</td>
</tr>
<tr>
<td>DF</td>
<td>52</td>
</tr>
<tr>
<td>1-tailed p</td>
<td>0.4833 (t approximation)</td>
</tr>
</tbody>
</table>

Higher P-value from 5% implies there is no relation between two variables at all.

- B- Diagram
  Below diagram confirms this result.
Fig. 2: No relation between variables in hypothesis.

- C- Spearman's Correlation Coefficient

Table 5: The correlation coefficient for hypothesis.

<table>
<thead>
<tr>
<th>Test</th>
<th>Correlation - Spearman</th>
</tr>
</thead>
<tbody>
<tr>
<td>n</td>
<td>54</td>
</tr>
<tr>
<td>rs statistic</td>
<td>-0.09</td>
</tr>
<tr>
<td>95% CI</td>
<td>-1 to 0.14</td>
</tr>
<tr>
<td>t statistic</td>
<td>-0.66</td>
</tr>
<tr>
<td>DF</td>
<td>52</td>
</tr>
<tr>
<td>1-tailed p</td>
<td>0.2565 (t approximation)</td>
</tr>
</tbody>
</table>

Higher value of P value from 5% implies there is no relation between two variables at all.

As it is shown by Diagram 2 and Table 3, the Spearman's correlation coefficient as (-0.01) which accepts H0. Also it can show that R2 amount is just (0.001) which accepts H0. Also, Table 4 showing the Spearman's correlation coefficient as (-0.09).

H$_0$: There is no negative relation between leverage index and company size between unsuccessful companies in Iran.

H$_1$: There is a negative relation between leverage index and company size between unsuccessful companies in Iran.

The test results of third hypothesis as follows:

- A- Pearson's Correlation Coefficient is presented in Table 5.

Table 6: The Pearson's correlation coefficient for hypothesis.

<table>
<thead>
<tr>
<th>Test</th>
<th>Correlation - Pearson</th>
</tr>
</thead>
<tbody>
<tr>
<td>n</td>
<td>54</td>
</tr>
<tr>
<td>t statistic</td>
<td>0.03</td>
</tr>
<tr>
<td>95% CI</td>
<td>-1 to 0.25</td>
</tr>
<tr>
<td>t statistic</td>
<td>0.22</td>
</tr>
<tr>
<td>DF</td>
<td>52</td>
</tr>
<tr>
<td>1-tailed p</td>
<td>0.5848 (t approximation)</td>
</tr>
</tbody>
</table>

Higher value of P value from 5% implies there is no relation between two variables at all.
B- Diagram
Below diagram confirms this result.

![Scatter Plot](image)

**Fig. 3:** Relation between variables in hypothesis.

C- Spearman's Correlation Coefficient

Table 7: The correlation coefficient for hypothesis.

<table>
<thead>
<tr>
<th>Test</th>
<th>Correlation - Spearman</th>
</tr>
</thead>
<tbody>
<tr>
<td>n</td>
<td>54</td>
</tr>
<tr>
<td>rs statistic</td>
<td>-0.2</td>
</tr>
<tr>
<td>95% CI</td>
<td>-1</td>
</tr>
<tr>
<td>t statistic</td>
<td>-1.5</td>
</tr>
<tr>
<td>DF</td>
<td>52</td>
</tr>
<tr>
<td>t-tailed p</td>
<td>0.0701</td>
</tr>
</tbody>
</table>

Higher value of P value from 5% implies there is no relation between two variables at all.

Diagram 3 and Table 5, shows the Spearman's correlation coefficient as (0.03) which accepts H₀ accordingly. Also R² amount is just (0.0009) which H₀ is accepted and H₁ is rejected. Table 6, showing the Spearman's correlation coefficient as (-0.02).

Overall conclusions of third hypothesis
There is (negative) relation just among financial leverage (leverage index) and profitability ratio. It can be said that they were not able to use financial leverage which leads to being harmful of them.

Table 8: The summary of test results verification related to effective factors of unsuccessful capital structures companies.

<table>
<thead>
<tr>
<th>H</th>
<th>Studied independent variable</th>
<th>P value</th>
<th>Diagram</th>
<th>Pearson's Correlation Coefficient</th>
<th>Spearman Correlation Coefficient</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Profitability index</td>
<td>&lt;0.0001</td>
<td>Incomplete &amp; negative correlation</td>
<td>(-0.05)</td>
<td>(-0.36)</td>
</tr>
<tr>
<td>2</td>
<td>Operational leverage</td>
<td>0.4833</td>
<td>No relation between two variables</td>
<td>(-0.01)</td>
<td>(-0.09)</td>
</tr>
<tr>
<td>3</td>
<td>Company size</td>
<td>0.5848</td>
<td>No relation between two variables</td>
<td>(0.03)</td>
<td>(-0.2)</td>
</tr>
</tbody>
</table>

Conclusion and Remarks:

Studying the financial statements of studied companies, we concluded that most of companies' liabilities were current and their long term liabilities were mostly saved employees vacations'. In such situations, long term investment decisions cannot be made accurately based on liabilities. In other words, they don’t have proper financial leverage for investment and profitability. Legal limitations of long term stock distribution, it's not being acceptable by buyers and high amount of bank interests can be accounted as effective factors for defining the optimum composition of capital structure by companies. The general governing conditions and not competency of Tehran Stock Exchange can impacts on the above mentioned results in a meaningful way. High
rates of bank facilities besides that banks and financial institutions have paid little attention to special conditions including average industrial return, sale market of company productions, cash inflows and outflows of active projects which leads to not take advantageous from facilities easily.

REFERENCES

Fama, E. and K. French, 2000. Testing Trade-off and Pecking Order Predictions about Dividends and Debt, working paper, University of Chicago and Sloan School of Management MIT.