

Prioritization Effective Factors on preference of investors in the stock portfolio selection in Tehran Stock Exchange using AHP and SAW methods: case study of SATA.

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Abstract: The purpose of this paper is Prioritization Effective Factors on preference of investors in the stock portfolio selection in Tehran Stock Exchange using AHP and SAW methods. In this paper, after the selection criteria of that are determined by modified Delphi method, the weights of criteria have been calculated by applying the AHP method. The SAW method is then employed to achieve the final ranking results. And an actual case example is presented to clarify the methodology. A two-phase AHP and SAW methodology is very flexible and suitable for various decision situations. Findings demonstrate that the P/E and E/S are the most important criteria and Maroon Petrochemical is best selection.

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1. Introduction

The term portfolio refers to combination of assets that include stocks, bonds and/or cash. The portfolio may be held by individual investors and/or managed by financial professionals, hedge funds, banks and other financial institutions. A portfolio is designed according to the investor's risk tolerance, time frame and investment objectives. Portfolio theory and related topics are among the most investigated areas of research in the economic and financial literatures. According to the theory, it is possible to construct an efficient frontier of optimal portfolio offering the maximum possible expected return for a given level of risk.

Stock market is a place where different shares of manufacturing and services, investments are traded. The main advantage of the stock market, long term investment through the sale of shares of companies supplying the necessary capital, experience. COD stock buyers need to have their money, their stock markets are the width of the sale and transfer of ownership of their new buyer. Unlike a stock deposit at banks to enjoy the numerous benefits of the minimum dividend growth stocks and its price is. In addition to the stock dividends received by shareholders of their investment mesh mole is changing in some cases more than the price of the stock has an annual dividend. Usually, if the non-scientific and traditional trading on the Stock Exchange for admission of high-risk, action ion and consequently also for himself, to expand market uncertainty are also effective. Those who light with a view to make look at the way the stock market, usually in the form of buying and selling of Scientific and Technical prefer. The purpose of this study is to

rank the factors in the selection of shares in this direction. The results suggest that the founding of the capital stock of the various factors considered important in selecting different types of shares such that they can be the most factors such as market trends, possible P/E stock liquidity ratio, EPS industry diffusion and continuous transparent information pointed. Aura though the stock portfolio selection in the stock is concerned with the study and analysis of the factors that influence the selection and beyond Stock selection, every few months, a competent person such as a stock broker or trust company consulted. This research is to study and classify the priority of influencing factors making investment decisions –making processes regarding the purchase of shares on the Stock Exchange. Purpose behind this decision making, rational choice selection of all the choice of kidney possible. Favorable making this is a based on the desired criteria. investment decisions that will have investors in exchange for stock selection are based on factors such as earnings per share, liquidity, market trends), but the price of three (relative price of profit, and choose stocks in the capital market in terms of what are the investors in stock market. important objectives in this study consist of the following cases can be mentioned.

To determine the most effective factors in the selection of shares in the capital market priority ranking of the most important factors influence.

To answer the main question of the research goals of (AHP) and technique (SAW) was used. Then, after reviewing the relevant literature and research papers as well as introducing an important factor in the choice of method (AHP) AHP and SAW the analysis presented here. Way of expressing

information about the rating, classification of data items of the final structure, and describe the paper forms.

2. Literature Review

What's in the advanced industrial countries and in other countries, investors are seen as a key component of stock. Investor investors in our country's prosperity exchange factors. Companies towards economic privatization and public shares, at practitioners should consider capitalism than venture capital investors and agents have accurate knowledge.

More complex and risky financial decisions people make every day is the way people live while the results of these decisions, especially when retirement is very effective. Better decisions require more information for a brighter future and a better understanding of factors that influence the transition option is selected. Capital market in order to select the best types of stock, understanding and recognition of the important factors impact Gzartr priority and importance of each of them seems necessary. Most of the financial theories assume that investors think logically, to increase their investment and financial signs to pay attention.

Investors when choosing the initial investment, risk and return and compare it with other potential investments that they can carry out, in this way, the level of risk that investors are willing to tolerate the characteristics psycho they depend on. Shefrin and Shlieifer, did research on the psychology of finance and investment decisions may be noted that the internal behavior of an agent such as knowledge, and behavior outside factors such as investment accept the effects of. (Shefrin and shlieifer, 2000)

Wameryd Details on the research conducted to better understand the psychology of financial decision making and financial markets led investors to finance his studies, but the behavior of investors and the investment paid. He strongly believes that the link between selection and investment behavior of investors. (Wameryd, 2001)

Solomin and ilcox, say the financial markets, significant environmental behavior of investors is that while most of this research has been conducted on the behavior of investors (Solomon and Wilcox, 1999). Haslm Baker, argue that three factors, dividends, future expectations among investors withdraw capital and financial balance Haymtfavty and these differences mostly due to investor characteristics such as age, gender, and psychological characteristics are important (Baker and haslem, 1999).

In 1997, Fisher and Statman found that it is illogical to say that the investment portfolio, are merely factors such as risk and return. Tell me this is

like saying that it's the price we pay attention only to buy fruits (Fisher & Statman, 1997).

In this study the more specific factors that affect investors in the stock exchange and have been exclusively in the areas of finance and investment.

3. Important factors in the selection of portfolio

Simply put, the investor is buying a stock sheet, risk and return is achieved. So the most important factors that affect the decision to purchase securities, yields and risks compared with other investment opportunities.

Rational investors, the Securities Exchange Selects the risk of having equal or greater benefit if they have the same output, select securities that have less risk, it is a mere naive these two factors in the selection of shares by investors know. Therefore, in consultation with several experts' fact, among the many factors influencing factors Chosen and the analysis and prioritization using AHP we paid.

After determining the criteria weight by analytic hierarchy process, using a saw, three options of deciding on the purchase of shares in the name of Maroon Petrochemical, hafari shomal and nafto gaz parsian and compare among them, the best option can be selected.

According to investigations, eight selection criteria are as follows:

3.1. Price-Earnings Ratio – P/E Ratio'

In general, a high P/E suggests that investors are expecting higher earnings growth in the future compared to companies with a lower P/E. However, the P/E ratio doesn't tell us the whole story by itself. It's usually more useful to compare the P/E ratios of one company to other companies in the same industry, to the market in general or against the company's own historical P/E. It would not be useful for investors using the P/E ratio as a basis for their investment to compare the P/E of a technology company (high P/E) to a utility company (low P/E) as each industry has much different growth prospects.

The P/E is sometimes referred to as the "multiple", because it shows how much investors are willing to pay per dollar of earnings. If a company were currently trading at a multiple (P/E) of 20, the interpretation is that an investor is willing to pay \$20 for \$1 of current earnings.

It is important that investors note an important problem that arises with the P/E measure, and to avoid basing a decision on this measure alone. The denominator (earnings) is based on an accounting measure of earnings that is susceptible to forms of manipulation, making the quality of the P/E only as good as the quality of the underlying earnings number.

3.2. Definition of ‘Earnings Per Share – EPS’

The portion of a company’s profit allocated to each outstanding share of common stock. Earnings per share serves as an indicator of a company’s profitability.

Calculated as:

$$= \frac{\text{Net Income - Dividends on Preferred Stock}}{\text{Average Outstanding Shares}}$$

When calculating, it is more accurate to use a weighted average number of shares outstanding over the reporting term, because the number of shares outstanding can change over time. However, data sources sometimes simplify the calculation by using the number of shares outstanding at the end of the period.

Diluted EPS expands on basic EPS by including the shares of convertibles or warrants outstanding in the outstanding shares number.

3.3. Definition of ‘Dividend’

A distribution of a portion of a company’s earnings, decided by the board of directors, to a class of its shareholders. The dividend is most often quoted in terms of the dollar amount each share receives (dividends per share). It can also be quoted in terms of a percent of the current market price, referred to as dividend yield.

Also referred to as “Dividend Per Share (DPS).”

2. Mandatory distributions of income and realized capital gains made to mutual fund investors.

3.4. Definition of ‘Price-To-Book Ratio – P/B Ratio’

A ratio used to compare a stock’s market value to its book value. It is calculated by dividing the current closing price of the stock by the latest quarter’s book value per share.

Also known as the “price-equity ratio”.

Calculated as:

$$\text{P/B Ratio} = \frac{\text{Stock Price}}{\text{Total Assets - Intangible Assets and Liabilities}}$$

Price-To-Book Ratio – P/B Ratio’

A lower P/B ratio could mean that the stock is undervalued. However, it could also mean that something is fundamentally wrong with the company. As with most ratios, be aware that this varies by industry.

3.5. Definition of ‘Price-To-Sales Ratio – PSR’

A valuation ratio that compares a company’s stock price to its revenues. The price-to-sales ratio is an indicator of the value placed on each dollar of a company’s sales or revenues. It can be calculated either by dividing the company’s market capitalization by its total sales over a 12-month period, or on a per-

share basis by dividing the stock price by sales per share for a 12-month period. Like all ratios, the price-to-sales ratio is most relevant when used to compare companies in the same sector. A low ratio may indicate possible undervaluation, while a ratio that is significantly above the average may suggest overvaluation. Abbreviated as the P/S ratio or PSR, this ratio is also known as a “sales multiple” or “revenue multiple.”

3.6. Definition of ‘Debt/Equity Ratio’

A measure of a company’s financial leverage calculated by dividing its total liabilities by stockholders’ equity. It indicates what proportion of equity and debt the company is using to finance its assets.

$$= \frac{\text{Total Liabilities}}{\text{Shareholders Equity}}$$

Note: Sometimes only interest-bearing, long-term debt is used instead of total liabilities in the calculation.

Also known as the Personal Debt/Equity Ratio, this ratio can be applied to personal financial statements as well as corporate ones.

3.7. Definition of ‘Return On Assets – ROA’

An indicator of how profitable a company is relative to its total assets. ROA gives an idea as to how efficient management is at using its assets to generate earnings. Calculated by dividing a company’s annual earnings by its total assets, ROA is displayed as a percentage. Sometimes this is referred to as “return on investment”.

The formula for return on assets is:

$$= \frac{\text{Net Income}}{\text{Total Assets}}$$

Note: Some investors add interest expense back into net income when performing this calculation because they’d like to use operating returns before cost of borrowing.

3.8. Definition of ‘Return on Equity – ROE’

The amount of net income returned as a percentage of shareholders equity. Return on equity measures a corporation’s profitability by revealing how much profit a company generates with the money shareholders have invested.

ROE is expressed as a percentage and calculated as:

$$\text{Return on Equity} = \frac{\text{Net Income}}{\text{Shareholder's Equity}}$$

Net income is for the full fiscal year (before dividends paid to common stock holders but after dividends to preferred stock.) Shareholder’s equity

does not include preferred shares. Also known as “return on net worth” (RONW).

4. Methodology

4.1. AHP Method

The analytic hierarchy process, introduced by Saaty, addresses how to determine the relative importance of a set of activities in a multi-criteria decision problem. The process makes it possible to incorporate judgments on intangible qualitative criteria along with tangible quantitative criteria (Badri, 2001). The AHP procedure organizes an unstructured decision problem at different hierarchical levels with the set of decision elements positioned at the bottom level, the set of decision criteria and sub criteria located at the intermediate levels, and the goal residing at the top of the decision hierarchy. Usually the decision elements represent a finite set of options or alternatives and the decision criteria represent a set of properties that are common for all the decision alternatives. The components in each level are then compared in a pair-wise fashion according to their importance using a static nine-point scale (Table 1), referred to as the “fundamental scale” by Saaty(1980). The pair-wise judgments are arranged in a positive reciprocal matrix $A=[a_{ij}]$, called the pair-wise comparison matrix.(Cakir, 2008).

Table1. A Nine-point importance scale

Definition	Intensity of importance
Extremely more important	9
Very strongly more important	7
Strongly more important	5
Moderately more important	3
Equally important	1

Definition Intensity of importance extremely more important 9 Very strongly more important 7 strongly more important 5 moderately more important 3 equally important 1 Source: (Albayrak and Erensal 2004)

One of the key advantages of AHP over other multi-objective decision models is being able to check the consistency in the judgments of decision makers.(Nepal and others, 2010).In order to control the results of the method, the consistency ratio for each of the matrices and overall inconsistency for the hierarchy are calculated. The deviation from consistency are expressed by the following equation consistency index and the measure of inconsistency is called the consistency index (CI).The consistency ratio (CR) is computed by dividing the CI by a value obtained from a table of random consistency index (RI). The consistency index (CI) and consistency ratio (CR) are calculated as follows:

$$CI = \frac{\lambda_{max} - n}{n - 1}$$

$$CR = \frac{CI}{RI}$$

CR= RI Where λ max is the largest eigenvalue of the comparison matrix, n is the number of items being compared in the matrix, and RI is a random index. If the $CR \leq 0.10$, the comparisons are acceptable (Albayrak and Erensal, 2004).

4.2. SAW method

Simple Additive Weighting (SAW) which is also known as weighted linear combination or scoring methods is a simple and most often used multi attribute decision technique. The method is based on the weighted average. An evaluation score is calculated for each alternative by multiplying the scaled value given to the alternative of that attribute with the weights of relative importance directly assigned by decision maker followed by summing of the products for all criteria. The advantage of this method is that it is a proportional linear transformation of the raw data which means that the relative order of magnitude of the standardized scores remains equal.

$$A * = \left\{ A | MAX \sum_{j=1}^n n_{ij} w_j \right\}$$

5. Result and Conclusion

In this paper, the weights of criteria have been calculated by applying the AHP method. The SAW method is then employed to achieve the final ranking results. After obtaining an expert opinion on prioritization criteria using AHP results were as follows (Table 2). Also results of SAW method is shown in Table 3. Findings demonstrate that the P/E and E/S are the most important criteria and Maroon Petrochemical is best selection.

Table2. Prioritization of criteria by AHP method

criteria	weights	Priority
P/E	0.241	1
E/S	0.191	2
DPS	0.151	3
ROA	0.111	4
L/E	0.102	5
ROE	0.099	6
P/BV	0.077	7
P/S	0.077	7

Table3.selection options by SAW method

weights	options	Priority
1.049	Maroon Petrochemical	1
1.006	Nafto gaze parsian	2
0.807	Hafari shomal	3

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